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EXCHANGES.

[Exchange notices (not over five lines) inserted free for subscribers. Notices will be inserted in the order in which they are received, and those at the top of the column will be removed only when it is necessary to make room for new ones at the bottom.]

AMARA. Being engaged in the study of this genus, I will determine specimens for collectors. These should be sent numbered. I am also anxious to obtain species in other genera of Carabidae not in my collection, from all parts of the world, and will purchase or exchange for same. Roland Hayward, Readville, Mass.

WANTED —Eggs, larvae or pupae of grasshoppers, dragon-flies, beetles, bugs, etc. Will give tropical butterflies in exchange. Denton Bros., Wellesley, Mass.

WANTED.—Material for the study of the hybrid or polymorphic butterflies of the genus *Basilarchia*, including larvae or pupae of *arthemis* or *astyanax*, imagos of *proserpina* or *arthechippus*, or any specimens showing unusual characters. Liberal exchange. Specimens retained will be deposited in Museum of Comparative Zoölogy. W. L. W. Field, Milton, Mass.

LEPIDOPTERA—For exchange, fertile eggs of *Hemileuca maia*. Alfred C. Sampson, Sharon, Mass.

I have a few specimens of *C. calleta* and *cinctus* to exchange for rare *Sphingidae* or Pupae of same. W. T. Buxton, 17 Walter St., Somerville, Mass.

WANTED.—Ova, larvae or pupae of *Limenitis ursula* and *arthemis*. Will give cash or exchange. H. H. Newcomb, 35 Court St., Boston, Mass.

FEB 23 1904

PSYCHE.

PROBLEMS IN THE GENUS BASILARCHIA. PLATES I–III.

BY W. L. W. FIELD, MILTON, MASS.

I. INTRODUCTION.

Among the representatives of the genus *Basilarchia* occurring in the northeastern United States are certain remarkable forms which seem in a measure to bridge the gaps between the three types to which specific rank has been generally accorded. Some of these intermediate forms have been figured and described as probable hybrids, others as aberrant or dimorphic forms; several others are known to which no distinct names have been given. This paper is the result of an effort to summarize the existing knowledge of these forms, in order to prepare the way for methodical investigation.

II. THE THREE GENERALLY RECOGNIZED SPECIES.

No attempt will be made here to present detailed descriptions of these familiar butterflies, which are treated in all the leading works on North American lepidoptera. It will suffice to point out certain pertinent facts.

1. *B. arthemis* Drury (Plate I., fig. 5, ♂; Plate II., fig. 4, ♂), the common white-banded species of the mountain districts, ranges very widely through Canada, and in the United States frequents northern New England, the Adirondack and Catskill regions, and a belt of country extending westward to Minnesota. About Boston it is very rare, but has been taken by Harris, Clapp, Miss Guild, Morse, F. H. Sprague, P. S. Sprague, Zerrahn and others. Reported instances of its capture south of the latitude of Boston are so scarce as to emphasize its almost complete restriction to the hilly country of the north. The species is reported from most stations either as single-brooded or as having a partial second brood. The larvae feed upon poplar and willow.

2. *B. astyanax* Fab. (Plate I., fig. 1, ♂; fig. 2, ♀), the blue-black species without white band, is absent from Canada with the exception of southern Ontario, and even in the United States encroaches very little upon the territory of *arthemis*. In general it may be said that *astyanax* seldom appears north of latitude 43°, but that south of latitude 42° it replaces *arthemis*. It is found as far west as the

Mississippi. About Boston it is much more common than *arthemis*. The larvae feed upon apple, willow, poplar, and wild cherry.

Astyanax is generally double-brooded, though at some points near its northern limit the second brood is only a partial one. This species is extremely variable both in size and markings. Very large examples, rivalling *Semnopsyche diana* in size, occur from New York city southward; and mingling with these are found specimens scarcely larger than the average *arthemis*. Both sexes attain to both extremes of size, though the larger specimens are usually females.

3. *B. archippus* Cramer, "the Viceroy" (Plate II., fig. 1, ♂; Plate I, fig. 6, ♀), is the most famous example of mimicry among North American butterflies. The mimicked species is *Anosia plexippus*, the Monarch or Milkweed butterfly. *Archippus* has, instead of the deep brown or blue-black ground color characteristic of the *Basilarchias*, the orange coloring of *Anosia*. Unlike its allies, but like *Anosia*, it frequents sunny open fields, and in such situations may be found throughout the eastern United States. It is triple-brooded throughout almost its entire range. The larvae feed upon several species of willow, and sometimes on poplar.

Archippus is extremely variable in size, like *astyanax*. The depth of the ground color also varies somewhat, and the mesial black line of the secondaries is often (more frequently in females) indistinct or incomplete. The incomplete condition is to be seen in the female here figured.[1]

III. THE PROBLEMATIC FORMS.

1. *Basilarchia proserpina* Edwards, the first of the problematic forms to attract attention, was described in 1865 from two males taken in the Catskill mountains, and redescribed later (Edwards '67, '69) when the same region yielded more material. The following is quoted from the notes accompanying the second ('67) description:

> On the same days I took about fifty *Arthemis*, all except two or three being males, and just from chrysalis. I have never known *Arthemis* so abundant in that locality. The variation among so many was remarkable, particularly in the width of the white band and the size of the russet spots above and below; in half the specimens these spots were wanting above, in others there were two or three and from that up to a complete series of large rounded spots; the color of under side ran through all shades, from blackish to brown, cinnamon and russet.

Notwithstanding his observations upon these intergrading forms, all of which he referred to *arthemis*, Edwards for some time believed *proserpina* to be a distinct species. Scudder ('72) treated it as a variety of *astyanax*, and in criticising this view Edwards ('73) suggested that it might be a dimorphic form of *arthemis*. The discovery of "other varieties of *proserpina*" led Scudder ('75) to adopt this view tentatively, though he suggested that *proserpina* might prove to be a hybrid between *arthemis* and *astyanax*. Two years later Edwards ('77) announced the rearing of larvae from eggs laid by a captured *proserpina*;[1] four came to maturity, giving three typical *arthemis* (or form *lamina*, as he then designated it) and one *proserpina* closely resembling *astyanax*.[2] After another space of two years, Edwards ('79) published a full account of his studies of *proserpina*, including an exhaustive list of localities in which it had been taken, and a history of the breeding experiments. On the plate accompanying this was figured a "variety" of *proserpina*, the oft-quoted specimen from Mr. Mead's collection.[3] This will be referred to later.

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[1] Strecker ('78) has described a variety, *pseudodorippus*, which altogether lacks the mesial line.

One of the most noteworthy features of *proserpina* is its distribution, which is almost wholly confined to the narrow zone in which the ranges of *arthemis* and *astyanax* overlap.

2. *B. arthechippus* Scudder, (Plate II., figs. 2, 3), generally regarded as a hybrid between *arthemis* and *archippus*, was described from a specimen taken at Chateauguay Basin, Quebec, in 1879, by Mr. J. G. Jack.[4]

The specimens here figured were taken in Alstead, N. H., by the Field brothers, in 1895 and 1896; still another was seen on the wing in the same locality in 1902, but not captured. The three above mentioned are now in the Museum of Comparative Zoology.

Arthechippus exhibits a very thorough mingling of the characters of its supposed parents, and the three specimens preserved are almost exactly alike in appearance. All three are males; whether females ever occur remains to be seen.

3. An unnamed *Basilarchia*, apparently a hybrid between *astyanax* and *archippus*, is represented by fig. 4 on Plate I. This specimen was obtained by Mr. A. P. Morse from Sherborn, Mass., and is a male. The ground color is mahogany brown; the spots of the inner row are deep orange, those of the outer row somewhat paler. There are no blue markings.

Mr. Jacob Doll has a similar specimen which was taken on Long Island, and one or two others have been reported.

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[1] The male which had impregnated this female was of course unknown.

[2] *Basilarchia astyanax* = *ursula* Fab. Edwards employs the latter name.

[3] This "variety" has also been figured by Scudder ('89) and Holland ('99), the latter failing to mention the fact that it is not a typical *proserpina*. The specimen reproduced herewith as fig. 6 on Plate III. resembles it closely, but lacks some of the red markings.

[4] Scudder ('89) refers to a second specimen, described by Edwards. This is an error; both Edwards and Scudder had seen the same specimen.

IV. THE "VARIETIES" OF PROSERPINA.

Proserpina is the only one of the problematic *Basilarchias* here listed which by its variability is susceptible of subdivision. That *proserpina* as heretofore treated comprises several well-marked forms I believe to be clearly apparent from the data already accumulated. Yet *arthemis* is credited in all our catalogues with being dimorphic only, and *proserpina* is given as the alternate form. To attempt a complete list of the proper subdivisions at this time would be premature; but it seems desirable to point out four of them, as follows:

(a) The typical *proserpina*, described by Edwards in 1865. The size is that of an average *arthemis*; ground color black or very dark brown; the mesial white band shows faintly as a broken row of dots on the primaries above, and somewhat more distinctly below. On the secondaries there is no mesial band, and the blue spots are very small. The female of this form was described by Edwards in 1868 as "similar" to the male. Figures 1 and 2 on Plate III. show two males of this form taken in Alstead, N. H.; the second specimen was reversed to show the under surface. Fig. 3 on Plate I. shows an example from Andes, N. Y.

(b) A larger form, with mesial band developed on primaries to about one-third of its area in typical *arthemis*, and broadest at the costa. Ground color dark as in the preceding, and blue spots restricted. On Plate III., fig. 3 shows a female from Sullivan County, N. Y., and fig. 4 a male from Alstead, N. H.

(c) A large form, with distinctly brown ground color; the mesial band appears on both pairs of wings, but is narrow and irregular as compared with the band on typical *arthemis*. Red spots appear on upper surface of secondaries as in most specimens of *arthemis*. Figured (Plate III., fig. 5) from a male taken in Temple, N. H.

(d) A form resembling *astyanax* (*ursula*) in many ways, yet having the white band well developed on all the wings. The blue scales on the upper surface of secondaries are abundant and brilliant. This form is called by some collectors a "white-banded *ursula*." A small specimen of this form, reared at Sharon, Mass., from a hibernating larva by Mr. A. C. Sampson, is figured as fig. 6 on Plate III.[1] Very large specimens, taken on Long Island, are in the collections of Messrs. Jacob Doll and H. H. Newcomb. There are two specimens in the Museum of Comparative Zoology; one of these is from Deerfield, Mass., and the other bears no locality label. The specimen from the Mead collection is similar to these, but shows more red on the upper surface.

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[1] This specimen is now in Mr. Newcomb's collection.

V. PROSERPINA CONSIDERED AS A POSSIBLE HYBRID.

Scudder ('89) treats *proserpina* as a hybrid produced by the crossing of *arthemis* and *astyanax*. The principal facts upon which he bases his theory are:

1. The occurrence of apparent hybrids *arthemis-archippus* and *astyanax-archippus*.
2. *Proserpina* resembles *astyanax* even more closely than *arthemis*, to which latter species Edwards has proved it to be in some way related.
3. In structure of genitalia *proserpina* and *astyanax* are precisely alike.
4. *Proserpina* is more variable than either of the supposed parents.
5. *Proserpina* occurs only in a narrow belt where the ranges of its supposed parents overlap.
6. "*Proserpina* is known at so many points in this belt, that it presumably occurs wherever *arthemis* and *astyanax* are brought into contact."
7. No dimorphic species is known of which one of the forms appears only along one edge of the territory occupied by the species.

VI. THE FACTS SUMMARIZED.

The three recognized species, *Basilarchia arthemis*, *B. astyanax* and *B. archippus*, all occur together in a narrow zone running westward from the Atlantic coast to the Mississippi river; north of that zone, *arthemis* and *archippus* occur together; south of it, *astyanax* and *archippus* occur together.

With these three species we may effect three different combinations of two species each, viz.: *arthemis-archippus*, *arthemis-astyanax*, *archippus-astyanax*.

Each of these three combinations is actually represented by an intermediate form.

Two of these intermediate forms, *arthemis-archippus* and *archippus-astyanax*, are generally believed to be hybrids, but their hybrid nature is as yet undemonstrated.

The third, *arthemis-astyanax*, is really a group of several interblending forms, assembled under the name *proserpina*.

The *proserpina* forms are either the results of the intercrossing of *arthemis* and *astyanax*, or polymorphic forms of *arthemis*.[1] They are found in the narrow zone above mentioned.

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[1] Grey ('79) has suggested that the three supposed species are polymorphic forms of one species. The statement here given does not necessarily preclude the view that *astyanax* and *arthemis* may both be forms of a single polymorphic species. Mr. H. H. Newcomb has suggested this to the Cambridge Entomological Club.

VII. Conclusion.

The futility of speculation and the importance of actual experiment are well shown in the cases presented. [The problems involved in the inter-relations of these butterflies are of interest to all biologists. They can only be solved by careful and long-continued investigation.

At the Alstead laboratory the effort will be made during the coming summer to breed hybrid *Basilarchias* in a large enclosure, with growing trees on which the larvae may feed. Quantitative studies of variation in this genus are now under way. It is hoped that before the close of the summer new light may be had upon the questions here discussed.]

I am indebted to Messrs. A. P. Morse, H. H. Newcomb and A. C. Sampson for the loan of specimens from their collections.

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NEW ACRIDIIDAE FROM THE SOUTHEASTERN STATES.

BY ALBERT P. MORSE, WELLESLEY, MASS.

DURING a rapid trip through the southeastern states the past summer under the auspices of the Carnegie Institution of Washington, for the purpose of studying the Acridiidae of that region, the following new forms were obtained. These include two species of Eotettix, one long-winged and eleven short-winged species of Melanoplus, and a Spharagemon.

Eotettix pusillus sp. nov.

A diminutive species readily distinguished from *signatus* by its size and nearly circular tegmina. Facial costa widest between antennae, nearly equalling interspace between eyes, with parallel sides, abruptly narrowed below the median ocellus to two-thirds of its width above. Disk of pronotum tectiform, distinctly convex in longisection, the mid-carina very pronounced, the lateral carinae faintly indicated on the prozone, obsolete on metazone. Tegmina broadly obovate or subcircular, two-thirds or three-fourths as long as the pronotum. Tip of male abdomen upturned, supra-anal plate triangular, nearly or quite as broad as long, pointed at apex, with sinuous sides. Furcula well developed, consisting of two broad flattened lobes as long as or longer than the last dorsal segment. Cerci subconic, shorter than supra-anal plate, two to three times as long as the width of base; acuminate, stout at base, tapering to a slender tip.

General color pale yellowish green, dorsum and tegmina dull yellowish brown. Lateral stripes on the sides of the prozone, more or less of the bases of the abdominal segments and genicular lobes of the hind femora, apex of hind tibiae, tibial spines and tarsal claws, black. Hind tibiae colored like the body.

Length of body; ♂, 10–12; ♀, 16–17; hind femora: ♂, 7.5–8; ♀, 9.5–11; antenna: ♂, ♀, 8–8.5; tegmina: ♂, 1.7 × 2 to 2 × 2.5; ♀, 3 × 3.5 to 3.3 × 4 mm.

Three males, one female, Waycross, Ware Co., Ga., Aug. 11; fourteen males, one female, Denmark, Bamberg Co., S. C., Aug. 15.

Eotettix paluetris sp. nov.

Intermediate in size and appearance between *signatus* and *pusillus*. Facial costa widest opposite base of antennae, equalling interspace between eyes, with convex sides convergent above and below, subparallel in lowest portion. Tegmina broadly oval with rounded apex, shorter than pronotum. Abdomen of male less upturned at tip than in *pusillus*; furcula well-developed, flattened or digitate; supra-anal plate triangular, its breadth nearly or quite equalling its length, the apex rounded, acute. Cerci conical, slender, tapering evenly, about three times as long as their basal width.

Color light yellowish green, brown above and on tegmina, with fuscous post-ocular stripes from eyes to tegmina. Hind tibiae red with black spines. This species and *signa-*.

tus agree in lacking the fuscous markings on the abdomen characteristic of *pusillus*, and in possessing red hind tibiae. In *signatus* the apex of the supra-anal plate is usually very bluntly rounded, and the tegmina are as long or longer than the pronotum, broad lanceolate, with acute apex.

Length of body: ♂, 15–15.5; ♀, 21.5; hind femora: ♂, 10; ♀, 14; antenna: ♂, 8; ♀, 9; tegmina: ♂, 2 × 3.5 to 2.8 × 4; ♀, 3.5 × 5 mm.

Three males, one female, Live Oak, Suwanee Co., Fla., Aug. 10.

Melanoplus symmetricus sp. nov.

A long-winged species allied to *robustus*. Furcula wanting. Cerci stout at base, laminate and a little incurved at tip, broad, nearly symmetrical, the basal half or three-fifths a little longer than wide, with subequal, subparallel sides; the distal half or two-fifths broadened equally above and below into a transverse plate with axis perpendicular to that of the stem, its length one and two-thirds times the width of the stem, the apex smoothly convex (sometimes sinuous through extension of lower angle of lobe), the proximal sides straight and leaving the stem at an angle of 30° or 40°, the dorsal portion of the plate slightly broader and its angle more rounded than the lower.

General color brownish testaceous; hind tibiae red with black spines. Hind femora stout, flavous on outer lower face, coral red within on basal two-thirds, often showing indications of oblique fuscous fasciae.

Length of body: ♂, 28–30; ♀, 31–34.5; hind femora: ♂, 16–18; ♀, 19–20; antenna; ♂, 13.5–14.5; ♀, 11–14; tegmina: ♂, 20–22; ♀, 21–23; vertex to tip of tegmina: ♂, 30–31.5; ♀, 30.5–33.5 mm.

Three males, six females, Carrabelle, Franklin Co., Fla., Aug. 9.

Melanoplus divergens sp. nov.

A short-winged species of the same size and appearance as *islandicus* and its two relatives here described but belonging in a different series and easily distinguished by the subbifurcate cerci. Vertex blunt. Pronotum broad with flattened disk, subangulate at junction with lateral lobes, and moderately convex hinder margin, the mid-carina distinct on the metazone, absent from prozone. Prosternal spine short and variable, usually conical with acutely pointed tip but sometimes much broadened laterally with wide, bluntly rounded apex. Mesosternal interspace slightly transverse in the female, narrower than the lateral lobes, quadrate or a little transverse in the male. Metasternal interspace slightly transverse in the female, longitudinal in the male. Tegmina shorter than the pronotum, ovate, or ovate-lanceolate, with rounded apex, usually covering second abdominal segment but sometimes half this length, attingent in the male, separated in the female. The subgenital plate is truncate or even slightly emarginate at apex, the sides viewed from above nearly straight. The supra-anal plate is longer than wide, triangular, pointed at apex, the sides convex. Furcula moderately broad, about equalling the last segment in length. The cerci are quite distinctive, recalling those of *minor* in outline, being roughly boot-shaped, the base very broad, a little longer than wide, its sides parallel or convergent, the distal two-fifths bent abruptly upward at an angle of 35° or 40° narrowed to about one-half the width of the base and tapering to a broad, evenly rounded blunt apex. At the union of the distal portion with the base the dorsal margin is deeply concave, the ventral margin strongly angulate, beyond the angle straight or a little concave, forming a sub-bifurcate organ as long as the supra-anal plate. The whole appendage is thick, strongly convex externally, especially on the tip, which is curved gently inward.

General color dark reddish brown above, yellowish beneath, the hind tibiae red. Post-ocular fuscous stripes on head and prozone and pronounced fuscous markings on sides of abdomen and hind femora. The female is sometimes yellowish brown above.

Length of body: ♂, 9–10; ♀, 11–20; hind femora: ♂, 8.5–9.5; ♀, 9.5–11; antenna: ♂, 6–6.5; ♀, 6–7; tegmina: ♂, 2–3, ♀, 2–4 mm.

Eight males, eleven females, Balsam, Jackson Co., N. C., July 24, about 5000 ft. Seven males, seven females, Aug. 19, 5000–6000 ft.

Melanoplus deceptus sp. nov.

Melanoplus viridipes in part. Scudder, Rev. Melanopli, p. 255.

Agreeing with *viridipes* in size, color, and markings but differing in the form of the cerci: in *viridipes* these organs taper somewhat regularly to the apex; in this species more or less of their distal third is distinctly broadened dorsally and obliquely excised at the end, the apex being acute and ventral; the ventral margin may be convex, straight, or slightly sinuous, the dorsal margin is concave in the mesial portion, sometimes strongly so. The whole organ varies much in breadth in different specimens.

Owing to its strong resemblance to *viridipes* this species has been confused with it by various authors and a specimen was included with the types of that species. The original descriptions and drawings, however, accurately delimit *viridipes* from this and the succeeding species.

Three males, eight females, Balsam, Jackson Co., N. C., Aug. 19, 5700–6100 ft. 1 male, Jasper, Pickens Co., Ga., July 26, 2600 ft. Three males, Vigo Co., Ind., June 8, received from Blatchley. One male, Indiana, Scudder collection in M. C. Z., type of *viridipes*.

Melanoplus similis sp. nov.

Very similar to *viridipes* and *deceptus*. The tip of the abdomen is less clavate and upturned; the basal half of the cerci tapers rapidly on the dorsal side to less than half the width of the base, sides of distal half parallel, apex transversely excised, the angles rounded, the dorsal one slightly more prominent; the ventral margin is nearly straight, though slightly concave and sinuous, the dorsal margin strongly concave in the middle, convex at base.

In color and markings this species strongly resembles *viridipes* and *deceptus* but possesses distinctive characters in the markings of the abdomen (as well as in the form of the cerci). In this species the subgenital plate is shining black, the preceding sternite greenish white with a very broad triangular fuscous spot extending across its posterior margin below the upturned subgenital plate from which it is separated by a lenticular pale space along the suture. In *deceptus* and *viridipes* the anterior margins of several of the abdominal sterna are conspicuously infuscated as well as both margins of the sternite preceding the subgenital plate.

Three males, Murphy, Cherokee Co., N. C., July 25.

Melanoplus celatus sp. nov.

Closely related to *M. islandicus*, agreeing with it in size, coloration, markings and form with the following exceptions.

Cerci of male similar to those of *islandicus*, stout at base, tapering equally, or more rapidly in basal portion, to a slender, flattened tip, once and a half or twice as long as width of base, symmetrical, the tip not bent upward nor grooved externally as usual in *islandicus*. Subgenital plate averaging shorter on the dorsal margin than in *islandicus*. Prosternal spine conic or cylindro-conic, the apex blunt, well-rounded,— in *islandicus* subpyramidal, acutely pointed, the sides flattened.

Five males, three females, Wytheville, Wythe Co., Va., Sept. 4 and 5, 3000 to 4000 feet.

Melanoplus sylvestris sp. nov.

This species also is a near relative of *islandicus* Blatchl., differing chiefly in the form of the male cerci, which, while of the same general structure, are narrower at base and have the distal half bent slightly upward and drawn out into a slender, compressed, substyliform tip, the whole appendage being once-and-three-quarters or twice as long as the width of base. The prosternal spine is very variable, ranging from subcylindrical with bluntly rounded tip to a more usual conical form with rounded apex.

Seven males, seven females, Blowing Rock, Watauga Co., N. C., July 19. Two females, Linville, Mitchell Co., N. C., July 18. Six males, six females, Loverings', Burke Co., (between Morganton and Pineola), July 13. Two females, Pineola, Mitchell Co., N. C., July 13; one male, (?) same place, Aug. 28. All at elevations of 3500 to 4000 ft.

The three species,— *islandicus*, *celatus*, and *sylvestris* — are evidently nearly related descendants of the same parent form, modified by isolation. Intergrades may yet be discovered. The male from Pineola is included with some doubt owing to differences in structure and season.

Melanoplus carnegiei sp. nov.

A short-winged species related to and resembling *scudderi* but with the cerci shorter, about as long as their basal breadth, equalling three-fifths of the supra-anal plate, triangular, acutely pointed, the sides straight or a little sinuous by reason of convexity of base; the ventral margin is usually the longer but sometimes the sides and base are subequal; thick at base, tapering evenly to the not at all incurved apex. Subgenital plate scoop-shaped, the end pointed, the apex rounded or slightly truncate. Furcula minute, barely discernible, scarcely half as long as last segment. Supra-anal plate triangular, longer than wide, pointed, the sides convex.

Pronotum resembling that of *scudderi* but scarcely as wide posteriorly; prosternal spine very variable, sometimes cylindrical and bluntly pointed, more usually flattened antero-posteriorly, apex broad and bluntly rounded or acute with straight sides. Tegmina shorter than in *scudderi*, nearly as long as pronotum, broad lanceolate with rounded apex, attingent or slightly overlapping.

Color and markings as in *scudderi*, the hind tibiae red.

Length of body; ♂, 14–17.5; ♀, 23–24; hind femora: ♂, 10–12, ♀, 13.5–14.5; antenna: ♂, 7–8.5, ♀, 8.5–10; tegmina: ♂, 2.5 × 4, 3 × 4.5; ♀, 3.5 × 6 mm.

Seven males, two females, Denmark, Bamberg Co., S. C., Aug. 15. One male, Spartanburg, Spartanburg Co., C. S., Aug. 16. One male, Blue Ridge, Fannin Co., Ga., July 25, 1700 ft.

Melanoplus strumosus sp. nov.

A small species with very small ovate tegmina, attingent in male, a little separated in female. Disk of pronotum twice (male) or once-and-a-half (female) as long as wide, mid-carina percurrent, lateral carinae barely perceptible mesially. Prosternal spine prominent, flattened cylindric, slightly curved backward, apex transversely excised, the angles rounded. Mesosternal interspace quadrate in female, slightly longitudinal in male. Metasternal interspace longitudinal, twice as long as wide (female), narrower in male. Tegmina obovate, two-thirds as long as pronotum. Hind femora stout, very obliquely bifasciate with fuscous. Hind tibiae glaucous, flavescent at base and tip, with black-tipped spines.

Male abdomen subclavate, the subgenital plate and preceding segment tumescent, broader than deep, and greatly elongated, the former elongate scoop-shaped, bluntly rounded at apex, its sides a little convex, especially at base. Supra-anal plate broader than long, somewhat trilobate at end by reason of deep, subapical lateral emarginations, the apex acutely pointed with straight sides, the basal three-fourths of each side smoothly convex, curving abruptly into the subapical emarginations. Its upper surface bears strongly raised edges and a prominent transverse ridge midway of its length, crossing two-thirds of its width. To this ridge extend, lying upon longitudinal ridges, the processes of the furcula; these are very broad at base, tapering equally to digitate, apically sinuate, tips which rest upon the ends of the transverse ridge, and enclose between them the shallow median sulcus, wide apically, narrow anteriorly. The base of the furcula and median portion of the segment bearing it are distinctly depressed; the median portion of the preceding segment is depressed to fit into this hollow, slightly elongated, widely and shallowly sulcate longitudinally, the sulcus transversely rugulose, with apical margin carinate opposite base of furcula. Cerci short and slender, about two-thirds as long as supra-anal plate, nearly three times as long as basal width, tapering evenly in basal half to one-fourth the basal width, distally bent gently upward and inward, the tip slightly expanded to about one-third the basal width, obliquely excised, the upper angle rounded, the ventral acute, the ventral margin convex or sinuous, the dorsal margin concave.

General color deep reddish brown above, whitish or flavescent beneath. Post-ocular fuscous stripe indistinct in female, deep black in male, percurrent, extending to abdomen, even suffusing the metepisternal pale fascia.

Length of body: ♂, 15; ♀, 17.5–22; hind femora: ♂, 10; ♀, 11.5–13; antenna: ♂, 6; ♀, 7; tegmina: ♂, 2 × 2.7; ♀, 2.5 × 3.5, 2.7 × 4 mm.

One male, two females, DeFuniak Springs, Walton Co., Fla., Aug. 5. Two females, Denmark, Bamberg Co., S. C., Aug. 15.

Melanoplus tribulus sp. nov.

A short-winged species of medium size. Disk of pronotum somewhat convex above, once-and-a-half (female) or twice (male) as long as wide, mid-carina percurrent, distinct, lateral carinae obsolete, hind margin a little convex, emarginate. Prosternal spine prominent, conical, acutely pointed, in female somewhat flattened antero-posteriorly. Tegmina broadly ovate, about three-fourths as long as pronotum. Male abdomen subclavate, considerably upturned. Subgenital plate with the sides much expanded basally, the ventral face very short, convex, terminating in a very short, blunt, upwardly directed fuscous tubercle distinctly removed from the inner margin. Supra-anal plate shield-shaped, with convex sides, abruptly narrowed to terminate in an acute point with straight sides. Furcula consisting of a pair of small, straight, flattened, backwardly directed, rather distant processes, about as long as the last dorsal segment. Cerci slender, three times as long as basal width, tapering in basal third to about half the basal width, equal in middle fourth, expanding a little distally into a laminate, obliquely excised tip, the upper angle rounded, the lower acutely pointed, the whole organ gently incurved and the tip slightly decurved.

Color dark reddish brown above, white and flavescent beneath. Post-ocular stripe continued into fuscous of sides of abdomen, sometimes suffusing the metepisternal pale fascia. Hind femora with fuscous genicular lobes and indications of oblique fasciae. Hind tibiae fuscescent glaucous with black spines.

Length of body: ♂, 18.5–19; ♀, 26; hind femora: ♂, 10.5; ♀, 12.5; antenna: ♂, 10.5; ♀, 8; tegmina; ♂, 3.5–4.3; ♀, 4.5 mm.

Two males, one female, Jasper, Pickens Co., Ga., July 25, 2600 ft.

Melanoplus devius sp. nov.

This species is nearly related to *tribulus* here described, agreeing with it in size, form, and shape of subgenital plate. Mid-carina of pronotum percurrent. Prosternal spine typically cylindro-conic and rather bluntly pointed. Furcula small and very variable. Supra-anal plate usually distinctly ampliate basally. Cerci narrow from a broad base, two and a half times as long as basal breadth, tapering gently in both breadth and thickness in basal half, the distal half equal or a little expanded apically, laminate, transversely excised at apex, the upper angle more rounded than the lower, the dorsal margin sinuous, the ventral concave. The fuscous markings of the end of the abdomen of the male readily distinguish it from *tribulus*: in this species the posterior face of the apical tubercle and the sides of the subgenital plate, the sides and anterior and posterior margins of the preceding sternite, are infuscated. In the female the sides of the abdomen are nearly free from fuscous markings. Hind tibiae glaucous with black spines.

Length of body: ♂, 17–20; ♀, 22–26.5; hind femora: ♂, 10–11.5; ♀, 11.5–13; antenna: ♂, 9–10; ♀, 7.5–8.5; tegmina: ♂, 2 × 2.5, 2.5 × 4; ♀, 2.8 × 3.5, 3 × 5 mm.

Twenty-three males, twenty-one females, Wytheville, Wythe Co., Va., Sept. 4 and 5, 3000 to 3500 ft. One male, Topton, Cherokee Co., N. C., Aug. 21, 3000 to 4000 ft.

Melanoplus decoratus sp. nov.

Related to *decorus* (Scudder, Rev. Mel., p. 257, pl. 17, fig. 5). Vertex rather strongly protuberant, especially in female. Pronotum with mid-carina strong on metazone, weak or indistinct on prozone. Tegmina asymmetrically obovate, the costal margin more convex. Supra-anal plate nearly as broad as long, the sides convex or sinuate, apex rounded or acute, the supernumerary longitudinal ridges feebly developed or indistinct. Furcula processes broad at base, rather strongly divergent, tapering, the sides more or less sinuate, once and a half or twice as long as the last dorsal segment. Cerci broader than in *decorus*, especially at tip, the apex transversely excised, the ventral apical angle produced, the dorsal well rounded, the extreme tip slightly recurved. Subgenital plate strongly constricted at base, (more than in *decorus*), the sides less ampliate basally, the apical tubercle much enlarged, produced, and curved upward, the ventral length of the plate almost or quite equal to its basal depth, the whole structure appearing more like a malformation than otherwise.

Color dark reddish brown, yellow beneath, sides of pronotum below post-ocular stripe white, the stripe percurrent, suffusing pale metepisternal fascia, continued nearly or quite to end of abdomen, sometimes rather faintly in female but more pronounced and constant than in the females of the other species here described. The body is stouter than in *decorus*, the hind femora shorter and stouter, and usually bifasciate.

Length of body: ♂, 15–18; ♀, 21.5–25; hind femora: ♂, 9.5–11; ♀, 10.7–12; antenna: ♂, 8.5–9.5; ♀, 8–9; tegmina: ♂, 2 × 3, 2.5 × 4; ♀, 2.8 × 4, 4 × 5 mm.

Two males, twelve females, Murphy, Cherokee, Co., N.C., July 25, 1800 ft. Two females, Topton, Cherokee Co., N. C., Aug. 21, 3000 to 4000 ft. One female, Blue Ridge, Fannin Co., Ga., July 25, 1700 ft. Three males, one female, Wytheville, Wythe Co, Va., Sept. 4 and 5, 3000 to 4000 ft.

Melanoplus australis sp. nov.

Related to *attenuatus*. Tegmina lanceolate with rounded tip,—in *attenuatus* elliptical, and almost truncate at apex. Furcula processes well-developed, broad at base, tapering (chiefly on inner side) to digitate tips, one-third as long as supra-anal plate,—in *attenuatus* one-fourth or less. Supra-anal plate resembling that of *attenuatus*, showing indications of the marginal dentate plication of that species. Cerci slender, very nearly symmetrical, three times as long as broad, the middle third narrowed to one-half or less of the width of the base, spatulate, with slightly emarginate symmetrical apex, the tip a little incurved, thin, and longitudinally inrolled, *i. e.*, from side to side convex externally, concave internally. Subgenital plate similar to that of *attenuatus*.

Color light yellowish green, without fuscous markings on sides of abdomen. Hind tibiae glaucous. Post-ocular fuscous stripe obsolete on metazone, interrupted on prozone by two narrow oblique yellowish green fasciae.

Length of body: ♂, 17; hind femora: ♂, 11.5; antenna: ♂, 12; tegmina: ♂, 2 × 3 mm.

One male, Savannah, Chatham Co., Ga., Aug. 14.

Spharagemon saxatile var. **planum** var. nov.

Differing noticeably from the specific type in the structure of the pronotum, the mid-carina, although of the same general form and profile, being lower throughout, and the disk of the metazone more nearly and constantly plane, instead of arched in longisection as is commonly the case in the type, especially in the female. Hind tibiae with an increased amount of infuscation distad of the pale basal annulus, in this respect sometimes approaching *bolli* in degree. The general color of the specimens at hand is a purplish red in consonance with the tint of the soil of the habitat; the pale X mark of the pronotal disk is lacking, and even the transverse fuscous bands of the tegmina are indistinct.

Twenty-two males, ten females, Wytheville, Wythe Co., Va., Sept. 4 and 5, 2300 ft., on a thinly grassed gravelly hill-slope.

AN ABNORMAL SPECIMEN OF *BEMBIDIUM SCUDDERI.*

BY ROLAND HAYWARD, MILTON, MASS..

While examining a number of examples of *Bembidium scudderi* recently received from Mr. H. F. Wickham from Humboldt Lake, Nev., I noticed a curious monstrosity in a specimen of that species which seems of sufficient interest to publish.

As is well known the dorsal punctures of the elytra are very constant both in number and position in our numerous species of Bembidium, and afford very useful characters for the subdivision of the genus into groups. With few exceptions they are two in number and are situated either on the third interval or the third stria. In two of our groups, one containing *lævigatum*, and the other *semistriatum* and *constricticolle*, they are placed in irregular rows on all the intervals. In two others they are three in number, being situated on the third stria in that of which *ricksecheri* is the type, while in the group containing *henshawi*, *consimile*, *scudderi* and *hageni* they are on the third interval.

In the specimen before me there are on the third interval of the left elytron the abnormal number of four punctures, while on that of the right there are three, placed as in normal specimens. On the left elytron the first puncture is in normal position, the second, however, is situated much nearer the base, while between it and the one nearest the apex, which is situated as on the right elytron, is interpolated an additional puncture, placed nearly midway between the second and fourth, but slightly nearer the latter. A curious fact to be observed is that only the first, second and fourth punctures are setigerous, the third showing no trace of seta. The setæ arising from the three dorsal punctures of the right elytron are also distinct.

Of course the case is a monstrosity only, showing as it does, in a small way, a deviation from bilateral symmetry, but it seems interesting that it should occur in a member of a group in which the normal number of dorsal punctures is in excess of that occurring in the vast majority of our species, and may possibly indicate an inherited tendency toward an increase in their number.

The group as a whole is confined to the western portions of our country and to Mexico. Only one species, *B. consimile*, occurs as far east as Nebraska, extending westward to Utah, while *henshawi* and *scudderi* occur in the region between western Wyoming and California. All three are found, as I learn from correspondents, on alkaline mud along the shores of saline lakes and ponds. Of the habits of *hageni* nothing is known.

SOME NOTES, AND DESCRIPTIONS OF FOUR NEW DIPTERA.

BY CHAS. W. JOHNSON, BOSTON, MASS.

Tabanus (Therioplectes) hinei, n. n.

Therioplectes being now considered at most only a subgenus of *Tabanus* necessitates the changing of *Therioplectes politus* Johnson (Entom. News, XI, 325, 1890) which is preoccupied in the genus *Tabanus* by *T. politus* Walker (The Entomologist, V, 256, 1871). I therefore propose for this species the new name *Tabanus hinei* in honor of Prof. Jas. S. Hine, who is making a special study of the Tabanidae.

During the past summer I have obtained four specimens of this species. Two males, Bridgewater, Mass., July 11, collected by Mr. Jos. A. Cushman, and two females, Woods Holl, July 25, and Auburndale, Mass, July 12, collected by the writer. The ♀ which has not been described, differs but little from the ♂ in general appearance except that the dorsal stripe of the abdomen is somewhat broader, with a slight dorsal spot or triangle on segments one to four, due chiefly to a small tuft of white hair, readily denuded. One of the males also shows a tuft of white hair on the second segment. Since writing the above I have seen three males of this species from Massachusetts, in the Museum of Comparative Zoölogy, Cambridge, one of which was labeled by Osten Sacken, "male of an unknown species."

Tabanus (Therioplectes) whitneyi sp. nov.

♀. Face, front and palpi reddish brown, frontal callus dark brown, narrowly triangular and extending as a narrow line to the base of the prominent ocelligerous tubercle; a space between the frontal callus and base of the antennae red; antennae red, third joint not excised, and showing no trace of a projecting angle; eyes apparently glabrous and a uniform brown, moisture failing to reveal the greenish bands so characteristic of the group. Thorax reddish brown, with grayish pollen forming four longitudinal stripes interrupted at the transverse suture, the two median stripes extending to the scutellum as a single dorsal line; pleurae reddish with gray pollen and red pile; scutellum brownish black, sides red. Abdomen reddish brown, a broad dorsal stripe and a wide lateral margin on all the segments, dark brown; the third and fourth segments bears a large quadrate central whitish area, the third having anteriorly a black triangle and the fourth a dorsal stripe, dividing it equally and leaving two regular squares; taking both segments together the maculation resembles a large letter H. Wings hyaline, veins margined with brown. Length, 19 mm.

♂. Face and front reddish brown except the upper triangular portion of the latter which is bright red. Eyes minutely pubescent, ocelligerous tubercle very conspicuous. Pile of the thorax larger than in the female but the stripes less clearly defined. Abdomen a uniform reddish brown and the markings on the third and fourth segments less distinct; the brown margins of the veins are also less pronounced. Length, 17 mm.

The ♀ collected by Mr. Albert P. Morse, at Wellesley, Mass., is in the New England collection of the Boston Society of Natural History. The ♂ marked "N. Y.," (Osten Sacken), is in the Museum of Comparative Zoölogy, Cambridge. This peculiar species, with unicolorous eyes, prominent ocelligerous tubercle, and *non* excised antennae, connects more closely *Therioplectes* and *Tabanus*. Dedicated to Mr. C. P. Whitney of Milford, N. H., an enthusiastic student of the *Tabanidae*.

Anastoechus nitidulus Fabr.

Anastoechus barbatus Osten Sacken, Western Dipt. Bull. U. S. Geol. Sur. III, 252, 1897.

The distribution of this species in North America is somewhat peculiar. Baron Osten Sacken based his description chiefly on specimens from Wyoming, Colorado and California and also records a specimen from Nantucket collected by Mr. S. H. Scudder, the middle of September. Several years ago I received from the late Andrew Bolter for determination a specimen also taken at Nantucket. Specimens have also been collected by Mr. Samuel Henshaw. Recently in going over a collection of Diptera from Mr. A. P. Morse, I was interested in seeing several specimens from Provincetown, Mass., collected Sept. 8, 1890, and Sept. 5, 1891. Aside from the Massachusetts records I know of no other captures east of Wyoming and Colorado. It is apparently common throughout the Rocky Mts. and Pacific States. I have specimens from Phoenix, Ariz., and Ellensburg, Wash., while Messrs. Viereck and Rehn collected it in numbers in the Sacramento Mts., New Mexico. Mr. Coquillett (Trans. Amer. Ent. Soc. XXI 110) considers *A. barbatus* O. S. a synonym of *A. nitidulus* Fabr. of Europe.

Opsebius pterodontinus Osten Sacken, Berl. Entom. Zeit. XXVII, 299, 1883.

Opsebius agelenae Melander, Entom. News, XIII, 180, 1902.

In looking over the collection of insects at the Peabody Museum, Salem, Mass., I was somewhat surprised to see a specimen of this species bearing the following label: "Massachusetts, Packard Coll." The specimen having been exposed to the light for a number of years, the pile is much lighter than on a specimen in my collection from "N. Ill.," and the abdomen is reddish brown not blackish brown. The wings of the two specimens show a marked difference in venation, the cross vein dividing the first posterior cell is wanting in the specimen from Illinois. Mr. Melander refers to the position of this vein as inconstant. The Massachusetts specimen has the projection on the costa very pronounced, with the sides nearly parallel, apex truncate, edges narrowly margined, and the center hyaline; in the other specimen the projection is conical and the costa more thickened.

The distribution of this rare species, based on six specimens, is as follows: Type from Dallas, Tex., Sept. 20; Austin, Tex., and Rochester, Wis. (Melander); N. Ill. (Bolter), Mass. (Packard). The ♀ is unknown. One of the Texas specimens was found by Mr. Melander entangled in web of *Agelena naevia* Bosc., having apparently issued from the shrivelled spider lying close by. The above synonymy was given by Dr. C. F. Adams in the Kansas Univ. Sci. Bull., XII, 32, 1903.

Acrocera fasciata Wiedemann.

Two specimens which agree in every respect with the brief description given by Wiedemann were bred from *Lycosa stonei* by Dr. T. H. Montgomery, Jr. (Proc. Acad. Nat. Sci. Phila. 1903, p. 68) who refers to the parasites as follows:—"One male and six females died from the effects of an endoparasitic dipterous larva. One spider contained two of these parasites, the others one each. After the parasite, whose bulk nearly equals that of the body of the spider, has eaten away most of the soft parts of the spider, it emerges through a hole it makes in the wall of the abdomen of the spider, and this emergence kills the host. It is strange that these spiders should live so long with such a huge parasite within them. A short time before the parasite escapes the spider acts in a peculiar manner, walking about spasmodically and often spinning aimlessly."

The larva is light yellow, 5 mm. in length, and resembles the figure given by Mr. J. H. Emerton (Psyche V, 404, 1890,) except that is more contracted towards the head, probably due to the alcohol in which it is preserved. The posterior half is globular in form, the anterior half showing quite clearly segmentation, and bear seven short, transverse, blackish, bristly roughened, pseudopodal ridges; on the posterior portion the ridges are usually divided and indicated by two small spots. The mouth parts show a mandibular structure.

The spiders from which Dr. Montgomery bred this species were collected in or near Philadelphia, Pa., and the two flies obtained, measure respectively 4 and 6 mm., a specimen from N. Illinois measures only 3 mm. Wiedemann's specimen came from Georgia. The larva described and figured by Mr. Emerton were taken at Waltham, Mass., in the spring of 1887, from the web of *Amaurobius sylvestris*, but he was unable to raise the adult fly. In May, 1889, he again visited the same locality and found several specimens in abandoned cobwebs and from a pupa succeeded in obtaining a fly of which an excellent figure is given, and I agree with Dr. Williston in referring it to *Acrocera fasciata* Wied.

Oncodes albiventris sp. nov.

Head black, antennae yellow. Thorax and scutellum black, shining, and covered with erect yellowish pile. Abdomen white, and marked with black as follows: — first segment with a large dorsal spot, the other segments with a short transverse basal band, which extends only over the dorsal third, and from which projects posteriorly, except on the last segment, a short dorsal triangle; third and fourth segments with a small spot on each side of the dorsal line near the posterior margin; all the segments with a small lateral triangle, most prominent on the last three segments; venter white, with a single transverse band on the last segment; the entire abdomen sparsely covered with whitish hairs. Legs yellow, coxae and basal half of the femora black, tips of the tarsi brownish. Wings hyaline, veins light yellow, tegulae whitish with a narrow hyaline margin. Length, 5 mm.

One specimen, Toronto, Ontario, Canada, July 18, 1896.

Argyra aldrichi sp. nov.

♂. Face, front and vertex silvery white, the latter about double the width of the face; cilia of the upper orbits black, and of the lateral and inferior orbits white. Antennae black, third joint slightly but evenly tapering to a blunt point, insertion of the arista almost apical. Thorax and scutellum shining green, humeri, pleurae and metanotum thickly covered with a whitish bloom. Abdomen slender, largely yellow, with black hairs, segments 2 to 4, narrowly margined with black, segments 5 and 6 black, with a white basal band; hypopygium black, the base of the small lamellae yellow. Coxae and legs light yellow, with delicate black hairs and bristles, hind tarsi black, outer portion of the front and middle tarsi brownish. Wing tinged with yellowish-gray, end of the fourth longitudinal vein but slightly inflected forward. Length, 5 mm.

One specimen, woods at Goose Neck, Shrewsbury River, near Long Branch, N. J., June 11, 1902.

Resembles *A. calceata* Loew, but the shape of the third antennal joint, and long, narrow abdomen without whitish bloom, distinguish this species. Dedicated to Prof. J. M. Aldrich, who has done so much to further our knowledge of the *Dolichopodidae.*

Platypeza (Calotarsa) ornatipes Townsend.

Calotarsa ornatipes Town., Can. Entom. XXVI, 50, 102; *Platypeza ornatipes* Banks, *l. c.* p. 88; Coquillett, *l. c.* 102; Williston, *l. c.* p. 116; Snow, Kans. Univ. Quar. III, 143, 207; Johnson, Ent. News, VIII, 254.

Among some Diptera collected by Mr. Owen Bryant on board the schooner "Sunshine" five miles east of the Isles of Shoals, Sept. 5, 1903, were thirteen specimens of this interesting species. Only the ♂ is known, and readily recognized by its remarkably exaggerated and elaborate hind tarsi. Later (Oct. 1.) I secured one specimen on the window of the Museum of the Boston Society of Natural History. Described from Illinois, and later recorded from Ithaca, N. Y.; Brookings, S. D., and North Mt., Pa., Sept. 3, 1897; this is the first New England record.

Mr. Bryant also captured on the schooner, associated with the above species, *Platypeza pallipes* Loew, *P. obscura* Lw. and *P. velutina* Lw. Strong westerly winds prior to that date had undoubtedly blown them from the mainland.

On Sept. 24, four specimens of *Platypeza pallipes* were taken on the windows of the Museum; two specimens of *P. obscura* at Auburndale, Mass., Sept. 13, and several specimens of *P. velutina* at Dedham, Cohasset and Auburndale, Mass., Sept. 4–20. The latter species has been bred by Prof. Roland Thaxter from *Agaricus campestris.* The pupa is flat, oval, with jointed thread-like processes on the sides of the segments; the larva is probably very similar.

Alophora magnapennis sp. nov.

♀. Face and front whitish, with white pubescence; vertex and a lunate spot above the base of the antennae brown, from the ends of the latter a brown line extends half way down the face; vibrissae black; antennae brown. Thorax black, prothorax with yellowish pubescence, divided by four black lines (the remainder of the thorax too much disfigured to describe). Abdomen bright red, covered with fine black hairs which are longer on the sides; all the segments bear a pollinose lateral margin. Legs reddish, with black hairs, on the under side of the basal half of the femora the hairs are white. Wings very broad, the costa excessively arcuate, grayish hyaline with dark brown covering the following portions:—the costal cells except a small triangle just before the tip of the first longitudinal vein, outer two-thirds of the marginal, and the anterior and apical two-thirds of the submarginal cells, from the latter it extends broadly on each side of the apical cross vein, fourth longitudinal and posterior cross vein slightly beyond the fifth longitudinal vein, it also extends inward along the fourth longitudinal and anterior cross vein, leaving only the central portion of the first posterior and the basal posterior half of the discal cell hyaline. Calypteres whitish margined with yellow. Length, 12 mm.

One specimen, Montreal Island, Canada, from Mr. G. Chagnon. Its large size and broad, maculated wings readily distinguish this species.

IDENTIFICATION OF SPECIMENS.—The Cambridge Entomological Club is prepared to undertake the identification of adult forms in all orders, free of charge, for paid-up subscribers to PSYCHE. The privilege of retaining specimens after identification, for insertion in the collection of the Boston Society of Natural History, is reserved. Each specimen submitted should therefore have a label bearing a number or other distinguishing mark, and the sender should keep a memorandum of these labels.

A DEPARTMENT OF BIBLIOGRAPHY will be instituted in the next number of PSYCHE. Brief references to current entomological literature will be presented. This department will hereafter be a regular feature of the journal.

ON THE RELATIONS OF CERTAIN MYRMECOPHILES TO THEIR HOST ANTS.

BY CHARLES T. BRUES, COLUMBIA UNIVERSITY, NEW YORK CITY.

Wasmann, to whom we owe the bulk of our knowledge concerning myrmecophiles, divides the series of staphylinid bettles which live with the legionary ants into four biological groups.[1]
These are,

1. **Mimicry Type.** Including those which mimic, to a greater or less extent, the color, form, actions and other characteristics of their hosts.

2. **Offensive Type.** (Trutztypus.) Including those not fostered or willingly tolerated by the ants, but living a precarious existence in their nests and only escaping destruction through the ants' inability to capture them.

3. **Symphily Type.** Including those which are tolerated on account of some benefit which the ants derive from them, usually forms with glandular hairs that secrete substances agreeable to the ants.

4. **Indifferent Type.** Less specialized forms whose relations are not so easily interpreted.

It is about the first two types that I desire to confine my present remarks.

We have naturally, not far to seek to find an explanation for the resemblance between the ants and many of their guests. It is evidently advantageous for the myrmecophiles to resemble their hosts in size, form, color, odor and any other attributes which the ants are capable of perceiving. This is, I think, perfectly evident, for all ants show the greatest good will toward the members of their own nest and the more their guests approach their own kind in appearance the more readily they are tolerated.

This applies most strongly to myrmecophiles which depend to a greater or less extent upon concealment for safety. Even in the case of forms which supply pleasant secretions to the ants or are beneficial to them in other ways, it must enter at least to some extent into their relations. Thus protected they may at times either deceive the ants as to their identity and pass unnoticed, or at least attract less notice than if they were entirely different from the ants in appearance. This is evidently the chief value of mimicry to the guests living with ants which can readily discriminate such objects as color and form. Among ants with a keen sense of sight then, guests of the mimicry type have probably been developed through a natural selection exercised by the ants of the nest in which they live. This selection tends to produce a convergence of the guests toward the form of their hosts.

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[1] Verh. d. deutschen Zool. Ges., 1902. p. 86.

In the case of certain blind ants, however, for example members of the genus *Eciton*, the cause for a mimicry of color (and perhaps also form) cannot depend upon the ants themselves, for they cannot see. Recently Wasmann[1] has taken a very peculiar view of this question. In regard to my suggestion (Amer. Nat. XXXVI, 367 (1902)) that the resemblance in color and form of *Ecitonidia wheeleri* Wasm. to *Eciton schmitti* Em. is due to the influence of outside enemies, he thinks that this is untenable. His chief objection with regard to color seems to be that the species of *Eciton* which have no external eyes have no known guests which mimic them in color, while those with rudimentary eyes, *e. g. Eciton schmitti* Em., have. He is evidently unaware of the fact noted by Wheeler[2] that the external eyes of *Eciton schmitti* are mere vestiges which have no connection with the brain, and are hence of absolutely no use! This, then, places *E. schmitti* on the same basis as the other species of *Eciton*, and we cannot say that they exercise any selection over their guests as regards color. The fact still remains that some ecitophiles are similar to the host ant in color while others are not.[3] However, with regard to the species of *Ecitonidia* which I have observed alive with its host ant (*Eciton schmitti* Em.), I am firmly convinced that its color resemblance is wholly for protection against insectivorous animals. No one can observe the files of this ant marching for long distances in the open glare of the Texas sun without being satisfied that color resemblance to its unpalatable host is very necessary to protect it from insectivorous enemies. On the other hand when one sees thousands of these same ants huddled together in a writhing mass in some small cavity under a stone, in company with specimens of *Ecitonidia*, it is hard to believe that the guests' presence is unknown to the ants, or that they could not get rid of them if they attempted to do so.

In spite of their blindness, it is probable therefore that Ecitons with such habits cannot as readily be deceived by a mimic as seeing ants which do not swarm in this manner.

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[1] Zool. Anz. Bd. XXVI, No. 704, p. 581.

[2] Biological Bulletin, III., p. 188. (1902.)

[3] **Possibly after the habits of some of the tropical species of Eciton are more carefully studied, reasons for the color difference may become apparent.**

NEW ENGLAND RECORDS FOR *ERITETTIX CARINATUS* SCUDDER AND *CONOCEPHALUS TRIOPS* LINN.

BY W. E. BRITTON, NEW HAVEN, CONN.

THE following species of Orthoptera, from the collection of the Connecticut Agricultural Experiment Station at New Haven, the writer believes have not hitherto been reported from Connecticut. Mr. A. P. Morse of Wellesley, Mass. has recently examined the doubtful material which the collection contained in this order, and I am indebted to him for making the determinations.

Eritettix carinatus Scudder.

Two adults: one taken by my assistant, Mr. B. H. Walden, at Southington June 30, 1903, in a dry field of grass and weeds. The other was taken at New Haven, June 16, 1902, by Mr. E. J. S. Moore, a temporary field assistant. Mr. Moore also took half grown specimens on October 31, 1902, at Mt. Carmel, nine miles north of New Haven, and on October 30, and November 2, 1902, at Maltby Park, in the town of Orange about three miles west of New Haven. Mr. Morse states (*in Litt.*) that this is the first New England record for the species.

Conocephalus triops Linn.

A single specimen taken by Mr. Walden in dry open fields near the Experiment Station at New Haven, October 3, 1902. This is the first undoubtedly native example to be recorded.

BOOK REVIEW.

The Orthoptera of Indiana. An illustrated descriptive catalogue of the species known to occur in the state, with bibliography, synonymy, and descriptions of new species. By W. S. Blatchley, State Geologist. Author's separate (Sept., 1903) from 27th ann. rep. dep. geol. and nat. res. Ind., 1902, pp. 123–471 + index, 3 pl., 122 cuts. Indianapolis, Ind.

This is distinctly the best account of the orthopterous fauna of a single state, prepared by a state official, and issued by the state, that has yet appeared, and forms an excellent example for others to follow. A similar work from each of the

The record of the last meeting was read and approved. Mr. F. H. Foster of Claremont, N. H., was unanimously elected to Associate membership. Mr. Morse then gave a most interesting account of his recent collecting trip through the southeastern states. Discussion followed, after which the meeting was adjourned.

W. L. W. Field,
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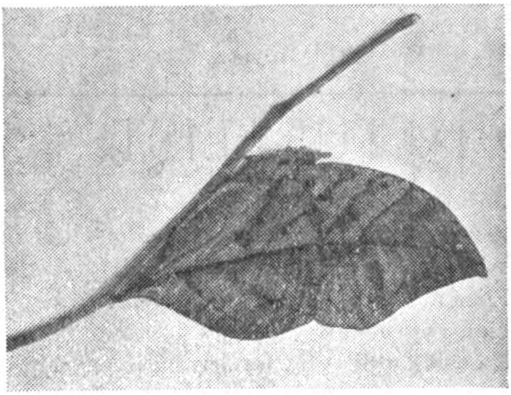

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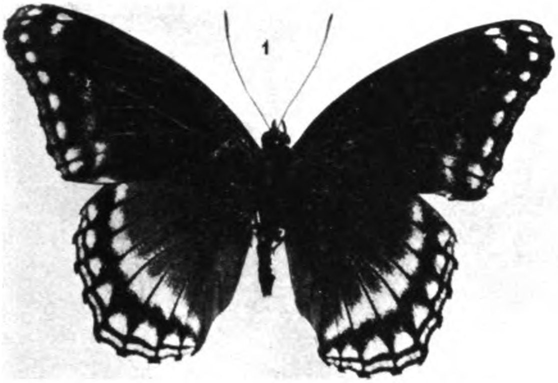

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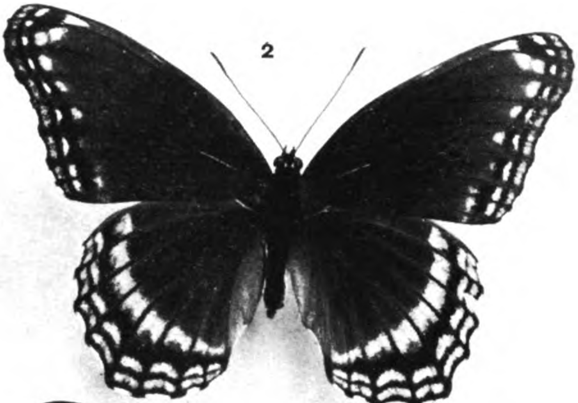

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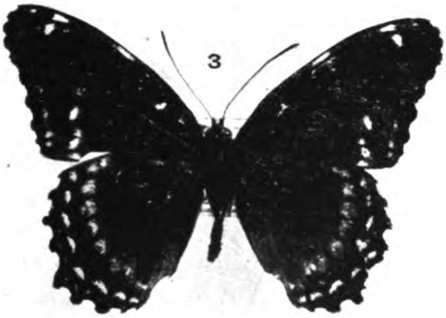

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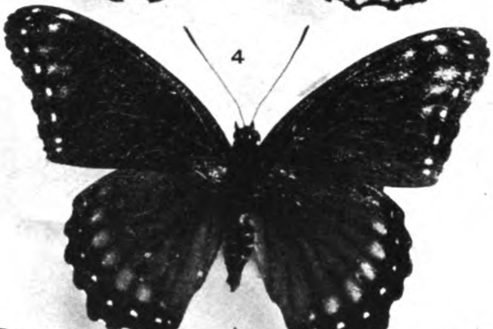

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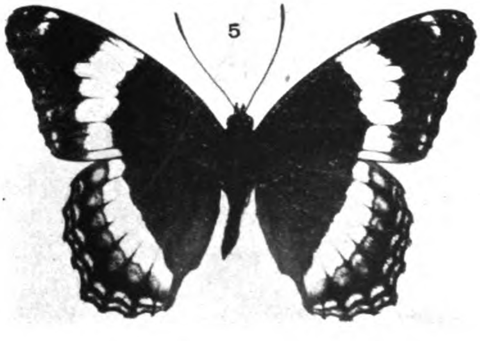

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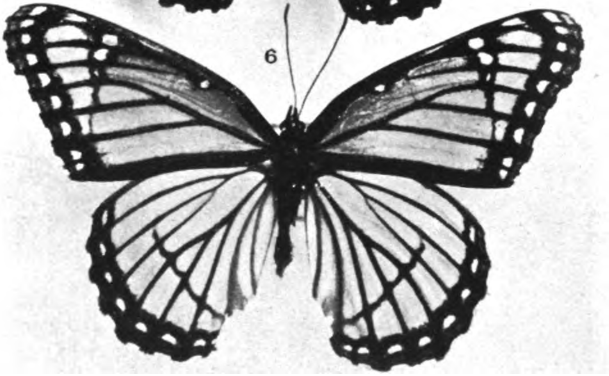

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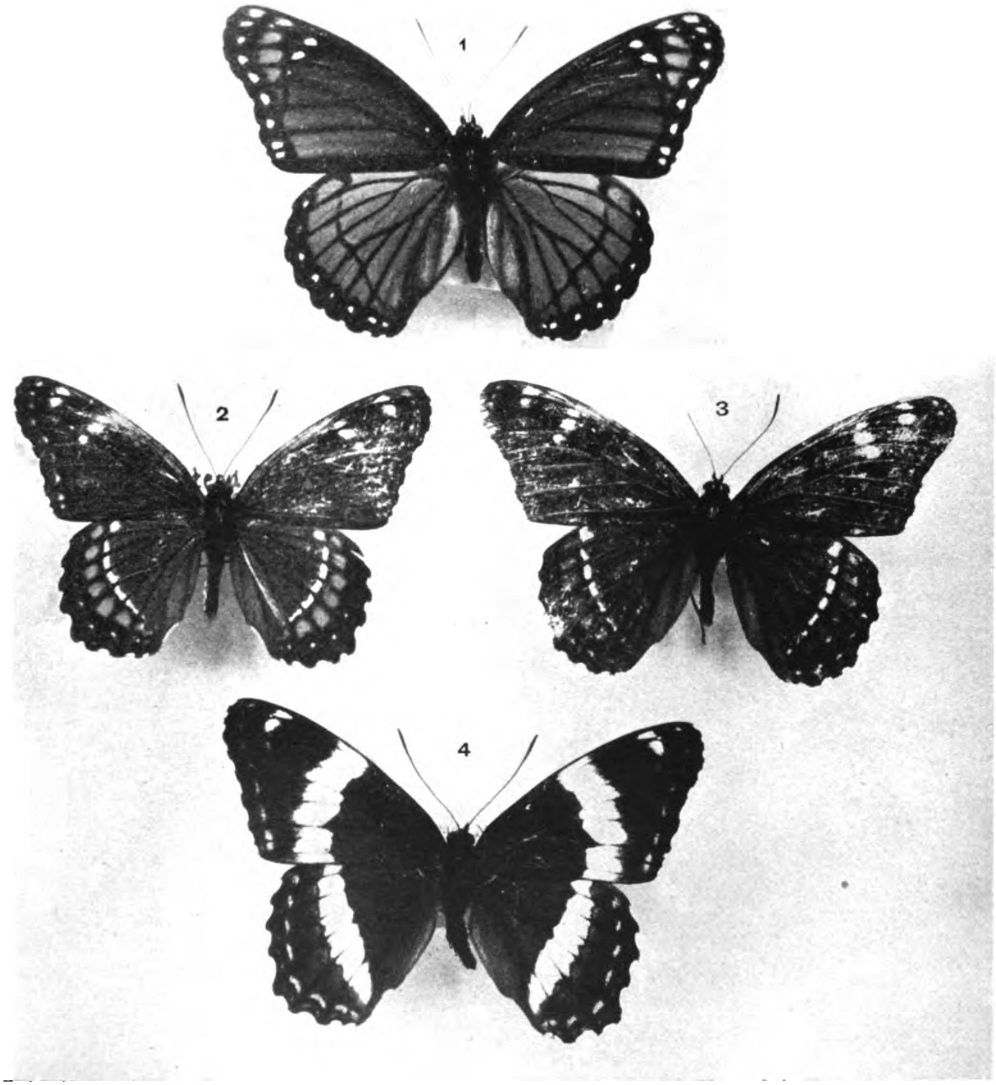

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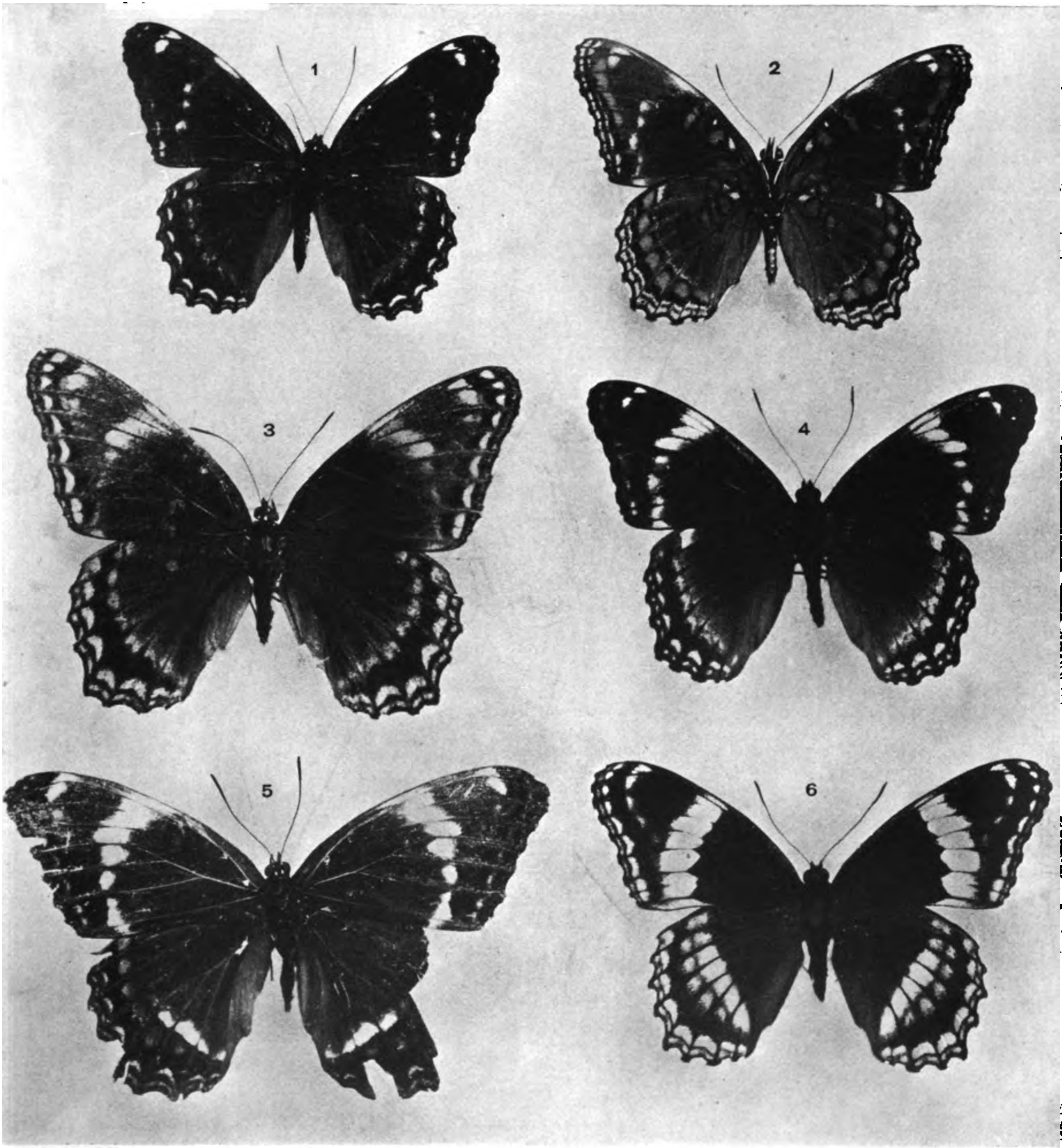

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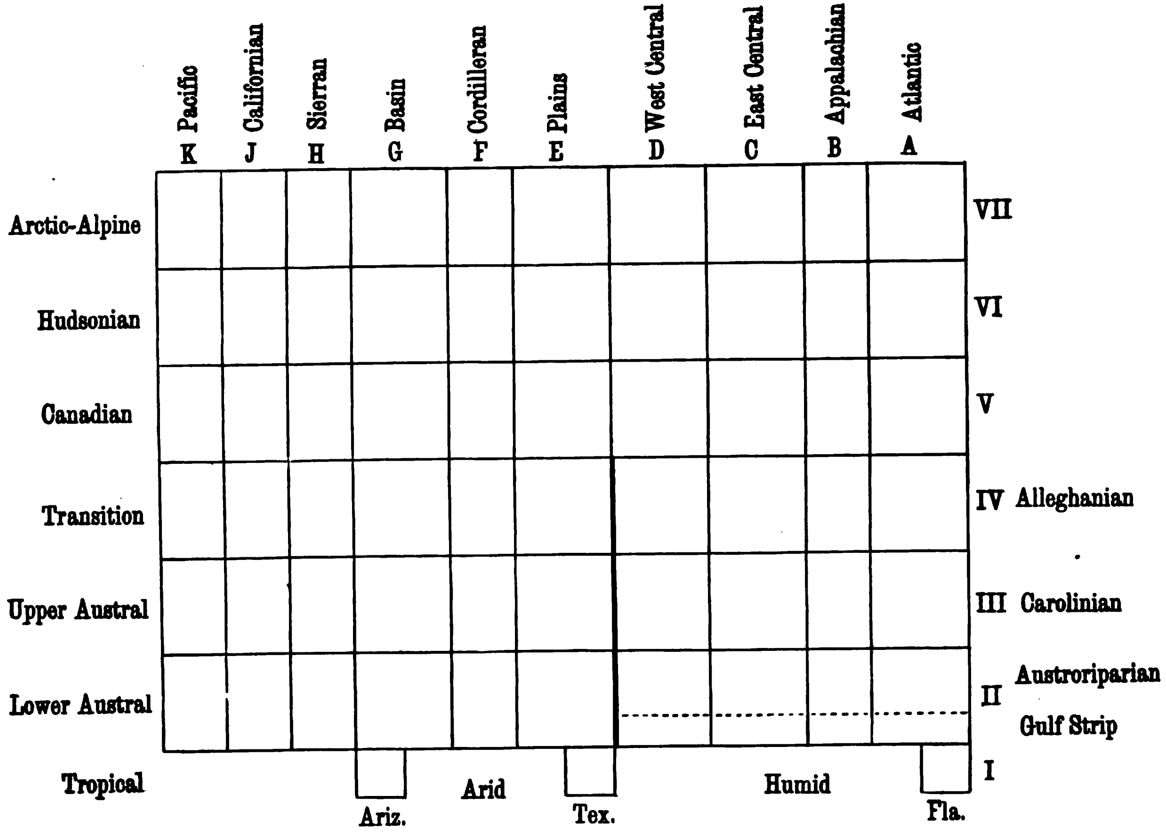

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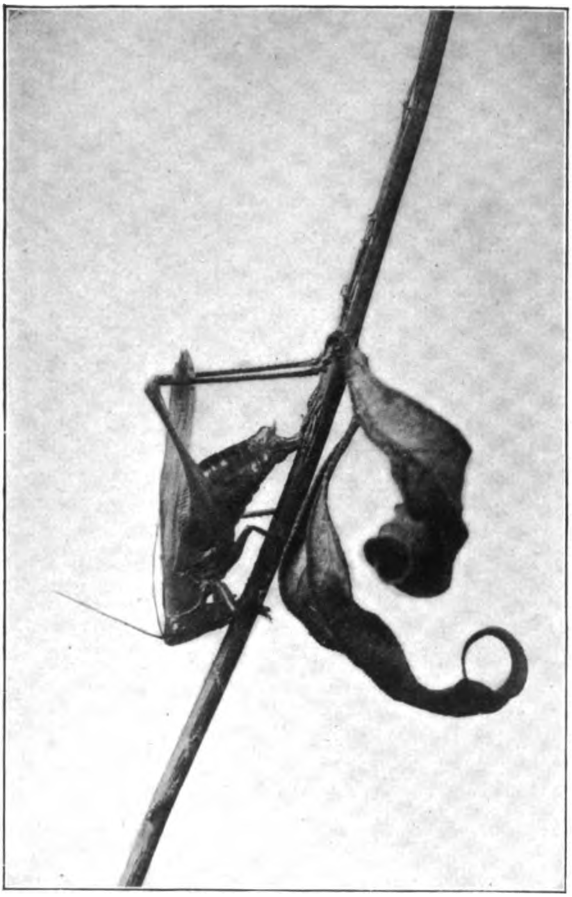
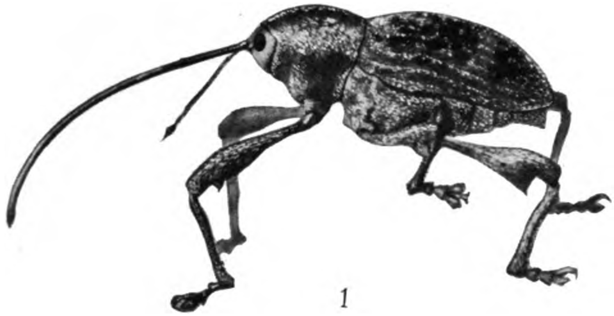


The green meadow grasshopper, *Orchelimum glaberrimum* Burm., ovipositing in the stem of the bur marigold. In each scarified spot, two eggs are laid in opposite directions, their anterior poles being disposed end to end. Photographed from life by Dr. J. L. Hancock. Magnified about two diameters.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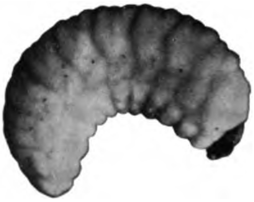
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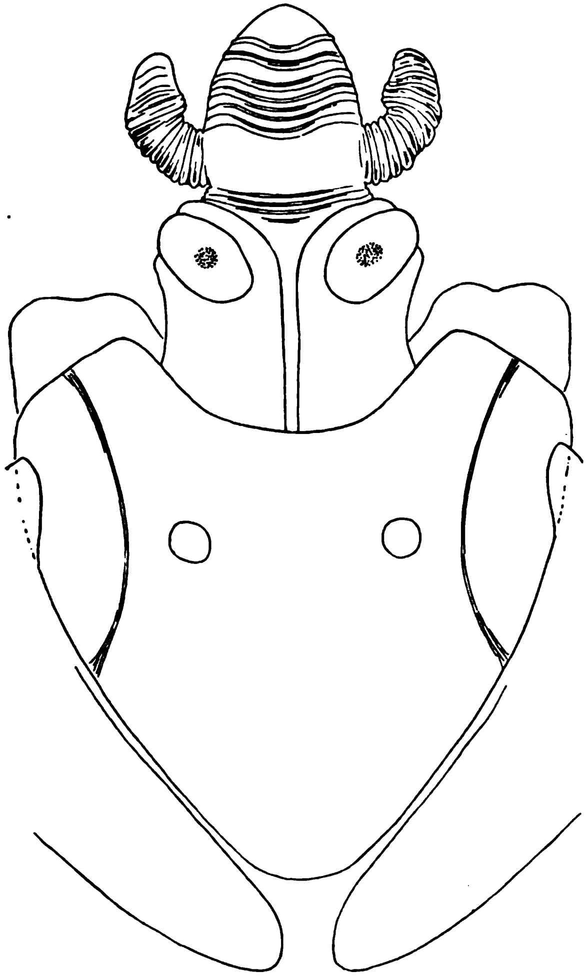
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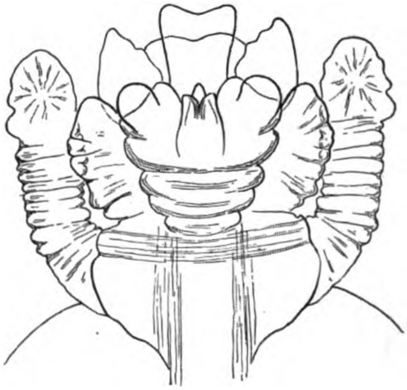

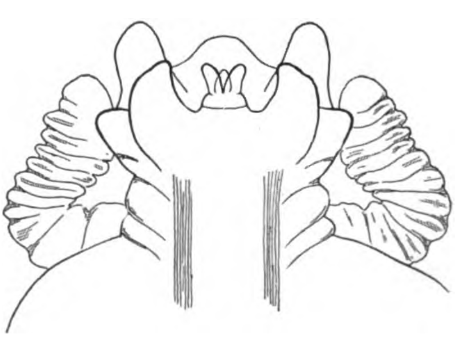
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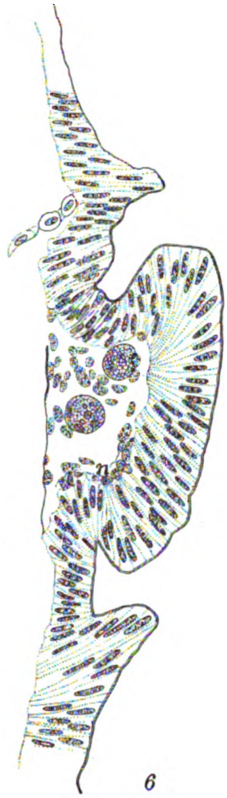

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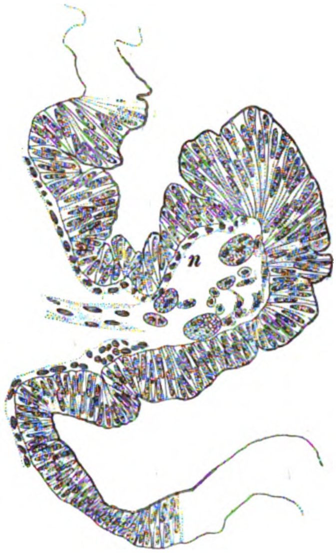

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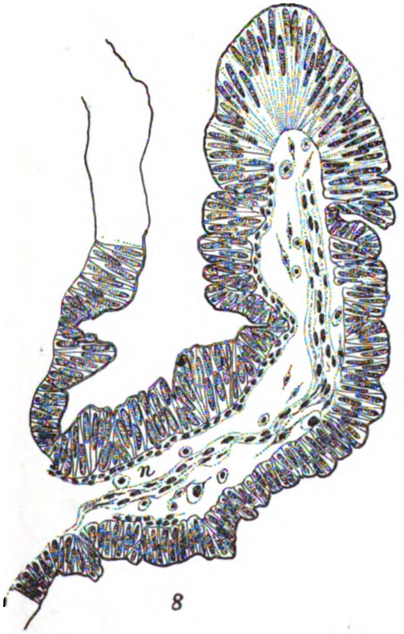

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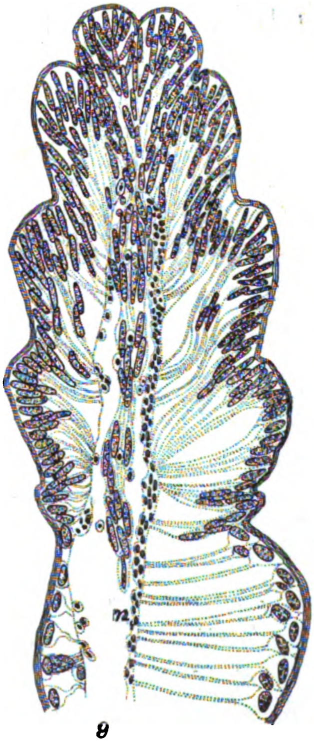

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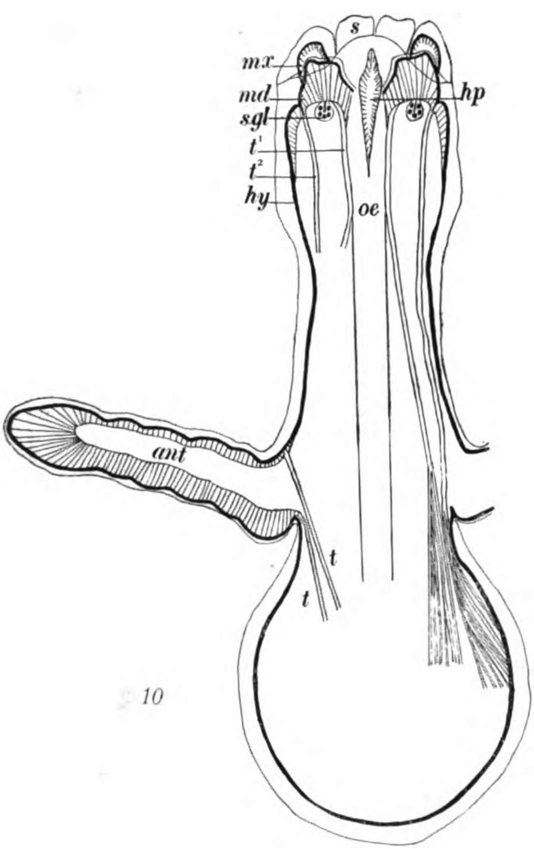

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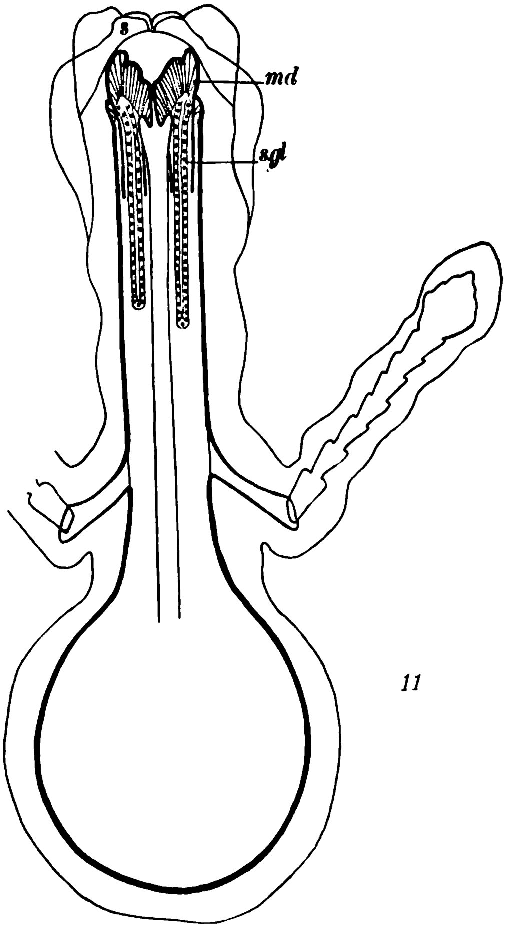

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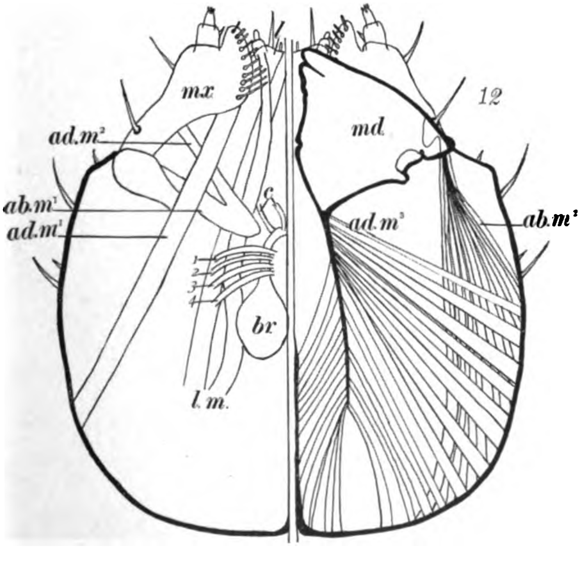

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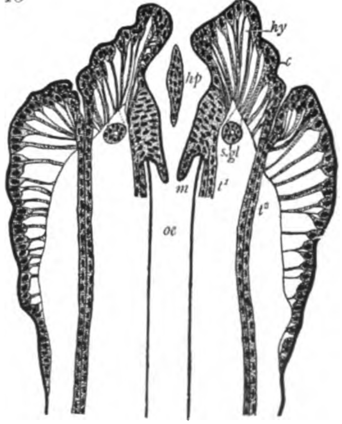

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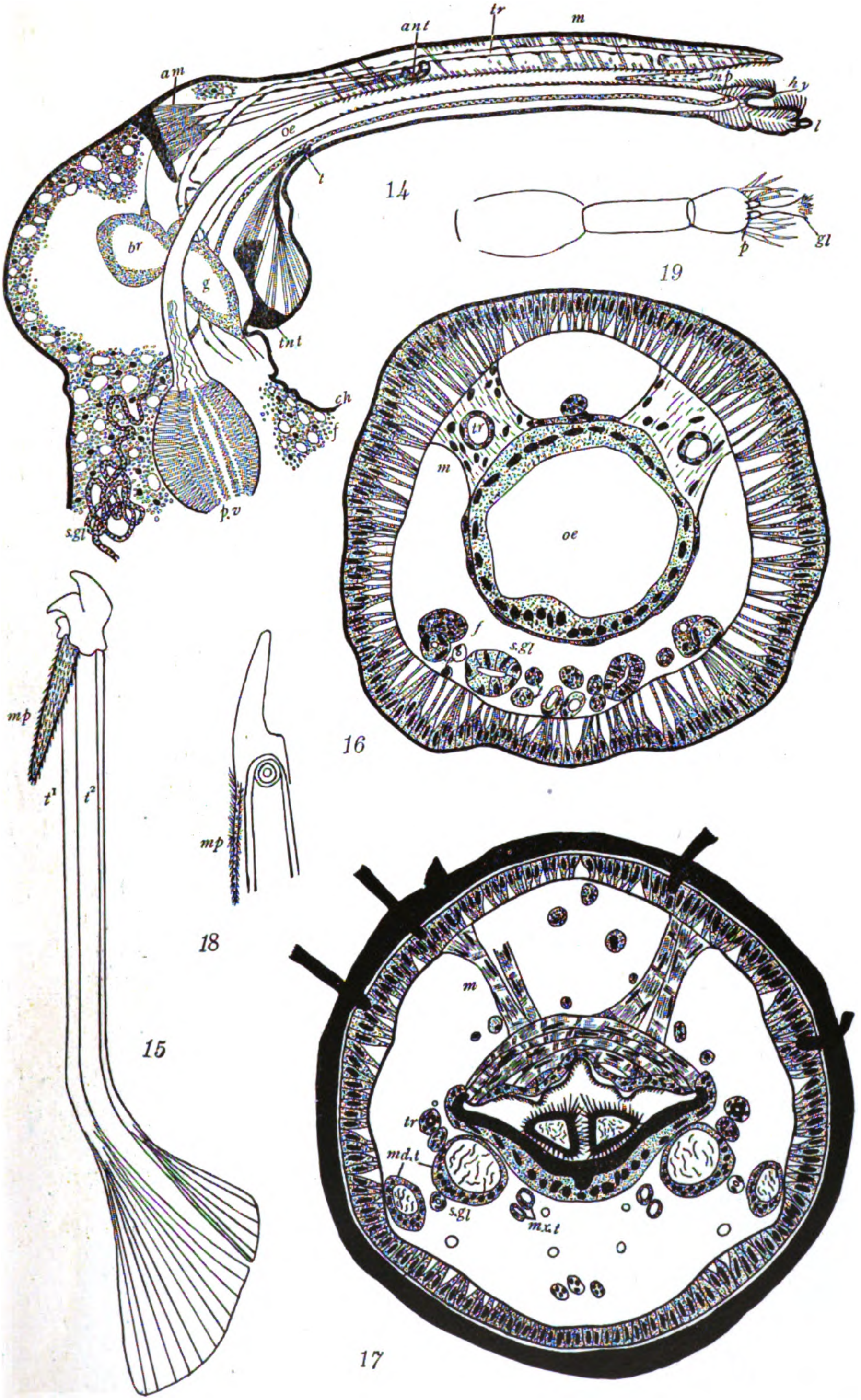

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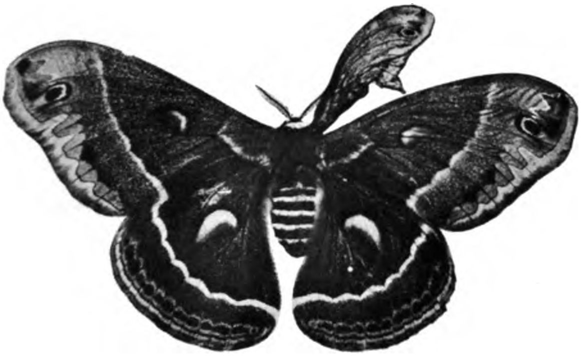

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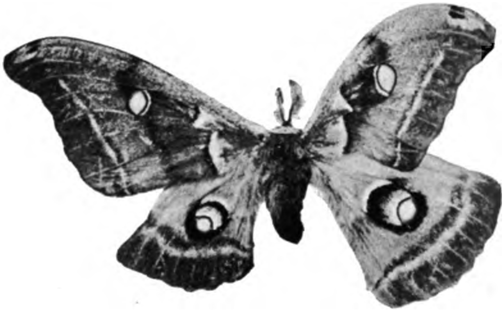

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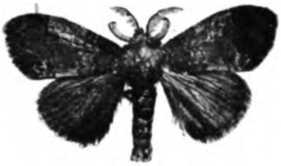

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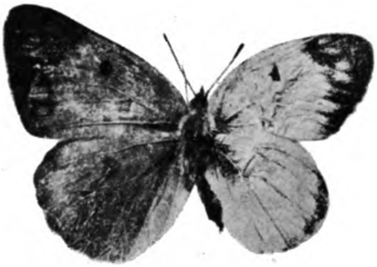

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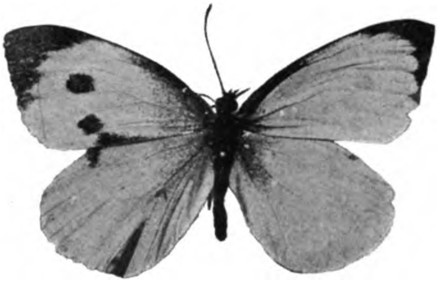

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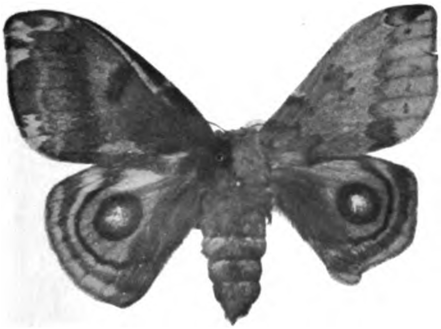

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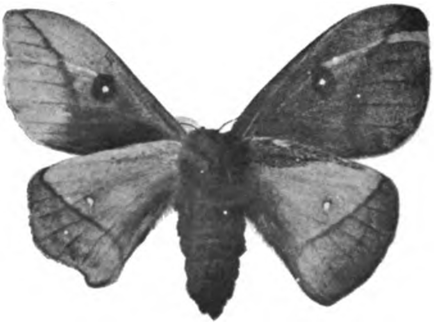

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NOTES ON THE BUTTERFLIES OF MARGARITA ISLAND, CARACAS, AND CARUPANO, VENEZUELA.

BY AUSTIN H. CLARK, BOSTON, MASS.

In 'The Ibis' for January, 1895, Dr. P. L. Sclater suggested to ornithologists the advisability of turning their attention to the Island of Margarita as a field hitherto unworked. As a result of this notice, Captain Wirt Robinson, U. S. A., visited this locality in the summer of 1895, bringing back an extensive collection of the birds of the island, a number of insects, and some mammals. Unfortunately, the butterflies were subsequently lost; but on working up the mammals and birds, no less than thirteen new species were discovered, two of the former, and eleven of the latter.

Having determined to spend the summer of 1901 in zoölogical investigation in some little known part of South America, I communicated with Captain Robinson, with the result that I decided to visit this locality, and make a study of its fauna, as complete as time would allow, to form a sort of supplement to his work.

Accordingly, on the 15th. day of June, 1901, I left New York for La Guaira, en route for Margarita. At La Guaira I stayed a day and a half, leaving there for the more pleasant city of Caracas, to await the arrival of the steamer which was to take me to Carupano. During my stay of about a week at Caracas, I made daily excursions into the surrounding country for insects; but a combination of circumstances prevented my making any captures while at La Guaira. At Carupano also, while hunting up a small boat in which to make the journey across the channel, I could not spare any time for collecting, but on my way back I obtained a few specimens here.

Reaching Porlamar, on the southern shore of the island, on July 3rd., I at once proceeded to the little town of El Valle, situated about three miles from the sea, in a pleasant valley at the foot of the central mountain. This village is partially surrounded by groves of cocoanut palms, and is a very convenient place of residence, the climatic conditions being much more agreeable than in the towns nearer the coast, while it is easy of access both to the hot country near Porlamar, and the mountain forest. The region is peculiarly heathful, and too much cannot be said of its inhabitants, who seem to consider it an honor to assist the collector in every way. In this town I resided until July 25th., when circumstances compelled me to leave suddenly, much against my will, as my collections were as yet far from complete. During my stay, however, I secured specimens of all the butterflies observed, with the exception of a *Morpho*, an *Opsiphanes* (?), a *Papilio*, a *Urania*, and *Colaenis julia*; but I am confident that more extended researches, over parts of the island which I was unable to visit, will bring to light many additions to the following list, and it is much to be desired that sometime in the future, others, profiting by the experience of Captain Robinson and myself, will visit this interesting locality and make a much more exhaustive report on its entomological fauna.

The island of Margarita is situated midway between La Guaira and Trinidad, directly north of the town of Cumana, being about seventeen miles distant from the nearest point of the mainland. Its greatest length from east to west is forty-two miles. It consists of two portions, joined by a narrow swampy isthmus of about twelve miles in length, the eastern part being the larger, in the shape, roughly, of a pentagon, some twenty miles across, while the western is an irregular quadrangle, twelve miles long by nine in width. In the eastern part there is a mountain of 3,240 feet altitude, thickly wooded almost to the base; in the western another rises to the height of 2,300 feet, but is practically barren.* At the time of my visit the only way of reaching the island was to take a small trading vessel from Carupano or Cumana, which ports could be easily reached by the boats of the French or Dutch West India Mail. Now, however, the boats of the Royal Mail Steam Packet Company, plying fortnightly between Barbados and La Guaira call in at both Carupano and Porlamar, Margarita.

Margarita is divisible into three well defined life zones, as follows:

I. The almost flat costal plain, which extends all about the island occupying a strip averaging two or three miles in width, hot and sandy, supporting only a very scanty vegetation, which consists of post and melon cactus, with patches of "tuna,"** and scattering thorn-trees. I saw no butterflies whatever in this region; but among birds the burrowing owls *(Speotyto)* are exclusively found here, and the troupial *(Icterus)*, scaled Dove (*Scardafella)* Buzzard *(Buteo)*, and parrakeet *(Conurus)* prefer it to any other. Here also I found the trail of a rattle-snake *(Crotalus)* which appears to be quite rare, as all the natives assured me that they never had seen a snake on the island, and I found no trace of others in all my wanderings. The armadillo is reported to occur in this district.

II. The intermediate zone, consisting of a rough hilly country, with a large amount of scrubby growth, and many varieties of cacti, including also the cassava plantations. Here the specimens of *Apodemia* were taken, and a single *Urainia* was observed. The birds characterizing this region are the Spine-tail *(Synallaxis,)* the cuckoos *(Diplopterus)* and the honey creepers *(Coereba)*; while among mammals the rabbit *(Lepus)* is practically confined to it.

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* A map of the Island was published in the Proceedings U. S. National Museum, XVIII, pl. XXXIII.

**A small, long-spined prickly pear, *Opuntia tuna*.

III. The forest region, including the whole of the mountain proper, and the valley in which the little town of El Valle is situated. This is, entomologically, divisible into three sub-regions, 'thus:

(a). The forest proper, including the greater part of the mountain. This, again is divisible into the drier portions, and the moist areas, in the immediate vicinity of water. Of the drier parts, the genus *Morpho* is the charactistic feature, which in the neighborhood of streams occur such forms as *Ithomia* and *Eurema albula*, and, in the lower portions, *Heliconius.*

(b). The intermediate forest region; where the little stream known as "El Rio," hardly more than a brook at the time of my visit, emerges from the thickly wooded area. This sub-region is the home of *Amphichlora poseidon* (see below), and in it *Heliconius melpomene* is found in greatest abundance.

(c). The valley region; consisting of cleared land with groves of cocoanut palms, interspersed with grassy patches, and the wooded borders of the river bed, which, at this season, is wholly without water. Here occur in abundance practially all the Pieridæ and Hesperidæ of the island, and such genera as *Eubagis*, *Agraulis*, *Lycaena*, *Euptychia*, *Mestra*, *Thecla*, *Anosia*, and *Amphichlora (ferentina)*. It was in this region that I saw the only specimens of *Papilio*, *Colaenis*, and *Opsiphanes* observed.

The whole fauna of Margarita is derived, as is that of the island of Trinidad, from South America, no purely West Indian forms being present, so far as known, among the birds, mammals, fresh-water fishes, or Lepidoptera. In fact, among the birds there seems to be a regular migration between the island and the mainland in the case of certain species (as the parrakeet); and I have seen numbers of Pieridæ *(Aphrissa, Phoebis, Callidryas)* in the channel, midway between the island and the Venezuelan shore.

The summer of 1901 was very dry* on Margarita, due to the partial failure of the spring rains. This may in some degree account for the paucity of the lepidopterous fauna, as represented by my collection. But it is true, without doubt, that there are many species, either local or erratic in occurence, which cannot be obtained except by a long residence in the locality. Captain Robinson has sent me a partial list of the lepidoptera he collected here. It contains ten species, only two of which are represented in my lot, which brings out graphically the difficulty of obtaining a complete list of the butterflies and moths of any given locality in the tropics.

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*While in Barbados, in January, 1904, Mr. L. T. Spencer, F. R. G. S., who has lately spent considerable time on Margarita, informed me that water was now scarcer than ever; so much so indeed that the English pearl fisheries company at Porlamar were forced to depend on distilled sea water. The cutting down of the forests to build ships is without doubt the cause of this, as it is on the English West Indian island of Carriacou.

PAPILIONIDÆ.

Papilio thoas Linn.

On Margarita I saw a butterfly apparently referable to this common species, although much below the average size, which I was unable to capture, owing to the nature of the vegetation. Captain Robinson writes me that he collected here an undescribed dwarf variety of this insect.

PIERIDAE.

While approaching the coast of Venezuela, I saw large numbers of Pieridæ, flying over the water in small scattered groups. On the mountain sides above La Guaira I observed thousands of these insects, all moving, as were those over the water, toward the east. On the way from La Guaira to Caracas, as well as on the mountain slopes in the vicinity of the latter city, they could be counted by hundreds, all, without exception, moving toward the east.* It seemed to be a migration, which was following the line of the coast, and going in the general direction whence came the trade winds.**

Leptalis sp.

An undescribable species of this genus was collected by Captain Robinson on the island, but subsequently lost.

Pontia monuste Linn.

The most abundant butterfly on Margarita; it occurs in the cocoanut groves, and especially in the patches of rank grass about El Valle. The majority of the examples were in worn condition. In the early morning it is commonly found clinging to the grass-blades and leaves, where it is a conspicuous object.

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*Mr. W. E. Broadway, Curator of the Botanic Station at Grenada, B. W. I., who lived for many years in Trinidad and who is an enthusiastic entomologist, tells me that *Urainia leilus* visits Trinidad every year from the mainland, coming over by hundreds, its movements being apparently comparable to those here described as observed among the Pieridæ.

**For a more detailed account, see Canadian Entomologist, Aug., 1903, p. 219.

Callidryas eubule Linn.

Common on Margarita.

Aphrissa statira Cramer.

Common, but not so much so as *Callidryas eubule.*

Phoebis argante Fabr.

Common at El Valle, associating with *C. eubule* and *A. statira.*

Gonepteryx clorinde Godt.

Occurred about El Valle, but was not abundant.

Kricogonia lyside Godt.

Two examples, a male and a female, taken near El Valle.

Pyrisita proterpia Fabr.

Obtained by Captain Robinson.

Pyrisita gratiosa Doubl. & Hew.

Four specimens obtained near El Valle. They are all paler than that figured by Doubleday and Hewitson, and than others from Central America which I have examined.

Eurema limbia Felder.

Fairly common. The examples are smaller than Godman and Salvin's figure (Biol. Cent. Am., Rhopalocera pl. 63, fig. 13) and the black border of the secondaries is not so broad, being generally reduced to a series of black points.

Eurema albula Cramer;

Specimens from Margarita are rather more heavily bordered than those from Panama, and the tinge of sulphur at the base of the wings is more pronounced.

This species was abundant in the deep forest in the vicinity of the water courses, but did not occur on the lower slopes of the mountain, nor about El Valle.

Eurema lydia Felder.

One specimen obtained.

Eurema vitellina Felder.

Occurred about El Valle.

NYMPHALIDAE.

Colaenis julia Fabr.

Seen on two occasions near El Valle, but eluded capture.

Agraulis vanillae Linn.

With the exception of *Pontia monuste*, this was the commonest butterfly occuring most abundantly in the cocoanut groves, especially in the more shaded portions. In flight it closely resembles *Colaenis julia.*

Apodemia erostratus Doubl. & Hew.

Specimens from Margarita have the black markings less extensive than in those figured by Doubleday and Hewitson, and by Staudinger.

This butterfly was found on the scrubby hillsides about El Valle. It was often seen in the hottest places, where there was practically no vegetation. It is readily captured, resembling in its habits *Euphydryas phaeton.*

Mestra hypermnestra Hubn.

Very common in the cocoanut groves and about the roadsides near El Valle.

Junonia coenia Hubn.

Common in the cassava plantations, about the borders of the cocoanut groves, and in the hotter portions of the groves themselves.

Eunica monima Cramer.

One battered example secured.

Eubagis agacles Dalm.

Several specimens obtained about El Valle.

Eubagis theseus Felder.

Common in the cocoanut groves about El Valle, occuring with *E. agacles*, but more abundant than that species. The contrasting black and white of its wings make it a rather conspicious object, considering its size.

Amphichlora ferentina Godt. [Plate I. fig. 2.]

Common in the cocoanut groves about El Valle. When flying it occasionally produces the clicking sound so characteristic of the group, and it always alights head down. When alarmed, it seldom goes far, often only to the next tree. Its flight is, as a rule, low, rather swift, and in a straight line, reminding one of the flight of *Argynnis lathonia* or of *Euptoieta claudia*, but is more hurried than that of either of these.

Specimens from Margarita differ from the continental examples which I have examined in being uniformly smaller, with a greater amount of white in the ground color of the wings, particularly of the secondaries.

Amphichlora poseidon, new species. [Plate I. fig. I.]

Type locality, El Valle, Island of Margarita, Venezuela.
Expanse, 2.6 in.

General ground color of the secondaries and basal third of primaries, a uniform pale dusty bluish gray, with reflections of reddish bronze.

Primaries. Outside of a crenulate line beginning two-thirds of the distance from the base of the wings to the end of the cell, and extending in a direction almost at right angles to the costal margin to a point one-quarter of an inch from the outer edge of the wing, on the posterior border, chalky white, with a narrow line of gray in the cell near its distal extremity, and a wavy gray line parallel to the outer border of the wing, beginning a quarter of an inch from the distal end of its inferior margin, and extending to the vein passing from the middle of the distal end of the cell to the edge of the wing, then turning and running to the costal margin in a direction at right angles to it. The distal border of the primary is light gray, interrupted in seven places by white streaks, the sixth from the apex being almost as wide as the distance apart of the veins between which it occurs. Just inside this border is a row of five white spots, separated from the general ground color by irregular borders of light bluish gray. The first two of these spots are small, and are situated at the apex of the wing; the third, which is larger, is separated from the second by two veins. The fourth, which is the largest of all, is separated from the third by one vein, and the fifth, which is small, is one vein beyond the fourth. Midway between the two apical spots and the wavy line mentioned above, there is a patch of light gray, which extends as far as the second vein from the costal margin. The part of the wing proximal to the crenulate line before mentioned is bluish gray, with two brownish zigzag lines running parallel to the outer margin of the wing, from the cell to the inferior border. In the cell there is a faintly enclosed median spot, in the middle of which there is a tinge of rufous.

Secondaries. Ground color bluish gray, with a slightly darker border, separated off by a wavy line of brown. Inside of this border are four ocelli, the two anterior being rather smaller than the others, and having white centres bounded proximally by crescents of dark brown. The two posterior ocelli have a median transverse band of black, with a lunate spot of white in the distal, and a corresponding patch of rufous in the proximal half. Inside of the row of ocelli is an irregular line of brown. Inside this line there are a few spots separated off from the ground color by narrow dusky lines, as follows: in the cell, about one quarter of an inch from the proximal end there is a double spot, extending transversely across the cell, and anterior to this a small circular spot. Just distal to this series, is a row of four spots, the most anterior of brown, and close to the small circular spot just mentioned; the next gray, and just the size of the anterior circular spot of the series proximal to this; the third small, and wholly brown, and the last, which closes the cell, long and narrow, with a gray centre.

The under surface resembles that of *A. ferentina*, but the brown markings are narrower, the rufous centre of the spot which occupies the middle of the central cell on the primaries lighter, and the whole surface shows a more pronounced coppery reflection. The tips and under surface of the antennæ are light rufous.

This species is readily distinguished from *A. ferentina* by the great amount of white on the primaries, and its lighter bluish color, bronzy reflections, small size, and finer markings on the lower surface. The two are easily recognizable in life at a considerable distance.

From all others of the genus it is distinguished by the colors as described.

Messrs. Godman and Salvin mention (Biologia Centr. Amer. Rhopalocera p. 269) a peculiar specimen of *Ageronia glauconome* which was taken at Manaure in northern Colombia, in which the cretaceous white of the primaries is more extensive, and more broken up with the gray marks than in the normal form. They state further that "the discrepancies are in the direction of *A. ferentina*, and the specimen may prove to be an extreme form of that insect, or a new species." From this very meagre description, it would seem that the butterfly referred to was *A. poseidon;* but we cannot be entirely sure; however, it is very possible that this species will be found to occur in suitable localities throughout Venezuela and Colombia.

On Margarita, as has been mentioned above, *A. poseidon* is found in the damper spots on the border of the forest, and does not seem to frequent the open so much as does *A. ferentina*, prefering, as a rule, the same kind of situations as those in which *Peridromia amphinome* commonly is found.

Historis odius Fabr.

While on the beach at Carupano I saw what I was positive was an example of this species, coming in over the sea from the direction of Margarita. It passed within a few feet of me, but I was unable to secure it. Captain Robinson tells me he secured an "*Aganisthos*" on the island, which might possibly have been of this species.

AGAPETIDAE.

Euptychia phares Godt.

The commonest of the genus of Margarita, occurring abundantly in the cocoanut groves, especially in the more shaded portions underneath the mango or other thick trees. Godman and Salvin say that this species is nowhere abundant, though having a very extensive range.

Euptychia camerta Carmer (*sosybius* Fabr.)

One specimen obtained, in company with *E. phares.*

Euptychia ocirrhoe Fabr.

Two worn and faded examples obtained near El Valle.

Euptychia renata Cramer.

One specimen secured.

MORPHIDAE.

Morpho sp.

Examples of this genus were sometimes seen in the forest, but never except as one looked down over the tree tops from some elevation.

BRASSOLIDAE.

Opsiphanes sp.

While resting under a mango tree one day, my attention became fixed on a peculiar projection from the otherwise perfectly smooth trunk. Investigation showed it to be a butterfly of this genus, perched head downward. As I had no net at the time it escaped, and I did not find any others.

HELICONIDAE.

Heliconius melpomene Linn.

Abundant on the lower slopes of the mountain, in the vicinity of water, especially at the place where "El Rio" emerges from the forest. It often strays into the cocanut groves, and sometimes into the street of El Valle.

ITHOMIDAE.

Ithomia andromica Hew.

Common in the forest, in the immediate vicinity of streams.

Ithomia hippocrenis Bates.

One specimen obtained in the forest near "El Rio."

Ithomia sp.

Captain Robinson reports finding two additional species of this genus on Margarita.

LYMNADIDAE.

Anosia plexippus Linn.

Common in suitable localities, particularly about the butterfly weed (*Asclepias tuberosa*).

Anosia berenice strigosa Bates.

Common, with *A. plexippus.*

LYCAENIDAE.

Thecla argiva Hew.

One specimen from El Valle.

Thecla sp.

A medium sized species of this genus was taken at El Valle, but was so worn as to make identification impossible.

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DESCRIPTIONS OF SOME MOSQUITO LARVÆ, WITH NOTES ON THEIR HABITS.

BY JOHN B. SMITH AND JOHN A. GROSSBECK.

The larvæ here described are figured with structural details in a forthcoming report of the New Jersey Experiment Station, on the "Mosquito Investigations"; but as that report will appear later than was expected, it is deemed best to give a few notes with descriptions of heretofore undescribed larvæ in advance. The descriptions were drawn up by Mr. Grossbeck from office material; the notes and comments are by the senior author.

Culex squamiger Coq.

Larvæ of this species were first taken in April, 1903, by Mr. Grossbeck near Paterson, N. J., in woodland pools associated with *Culex canadensis.* They were recognized as distinct from any other that we had met with, but were not bred. May 2nd., of the following year Mr. Van Deursen, another assistant, brought in a lot of what were accepted as full grown *C. canadensis* larvæ, collected in the woods near New Brunswick, N. J. Pupation began May 3rd, and adults commenced to issue May 7. May 9, a male *squamiger* was found with the *canadensis*, and an examination of the breeding jar resulted in the discovery of one *squamiger* larva and its identification with the Paterson form. No other adults hatched from the pupæ. Another collection was made May 16, mostly pupæ of *canadensis*, but amongst them were some very large ones. From this lot 3 ♂ and 2 ♀ *squamiger* emerged May 17; 5 ♂ and 4 ♀ May 18, and 2 ♂, the last of the lot, on May 19. Other collections in the same locality were made at intervals throughout the season; but no more larvæ were found. This indicates a single brood; furthermore, adults were taken up to the middle of July, the late ones being so worn as to be almost unrecognizable.

The larva in general appearance resembles *Culex canadensis*; but is much larger, measuring 12–14 mm., in length, exclusive of the anal siphon. It is dirty gray in color, excepting the head and siphon. The head is almost as broad as long, widest immediately below the eyes, tapering without curve to beyond the base of the antenna, flattened in front, light brown in color, and with four small black spots near the base of the vertex. On the anterior part of the vertex are four apparently single hairs, each arising from separate pits; the pits so placed as to form a square, slightly narrower in front; directly opposite the posterior pair, at the base of each antenna, is a small tuft of 4 to 5 hairs. The antenna is rather short, curved, uniformly brown in color, the surface sparsely set with short, stout spines and with numerous small spinules scattered on the basal half. The tuft of 4 or 5 hairs is situated at the middle of the shaft and does not reach the tip of the antenna, which has the apex terminated with one long and one short spine, two short bristles and a short articulated peg. The eyes are of moderate size, semi-circular in outline with a small detached portion at the posterior edge. The rotary mouth brushes are thick, with the hairs in the more central part distinctly pectinated. The mentum is triangular in form, about as long as broad and with slightly curved series of from 12 to 14 small teeth on each side of the apex. The mandible is normal, set with small spines at its base. The maxillary palpus is short and very broad, with hairs and spines arranged in patches on the surface and with a comparatively small apical tuft; the basal joint rather large, with small stout spines at its apex.

The thorax is rounded, with rather short hair tufts issuing from slight angles at the sides. The anterior margin also with two short hair tufts.

The abdomen is long, the anterior two segments transversely oblong and with lateral tufts of 4 or 5 hairs; the central and posterior joints lengthened and narrower, with only two hairs to the lateral tuft up to segment 7. The eighth segment has lateral patches of from 28 to 34 scales, without any regular arrangement; the single scale has spines at the apex and along the sides, the apical one largest and longest, the others diminishing in size toward the base. The anal siphon is about four times as long as its width at the base, and has two series of toothed spines, each ranging from 17 to 22 in number. The spines are black, white tipped, with the teeth not quite reaching the middle; a common arrangement is for four teeth to form two pairs. The ninth segment is longer than wide, with a double dorsal tuft and ventral brush, the latter confined to the barred area. The dorsal chitinized saddle does not ring the segment. The tracheal gills are only a little longer than the ninth segment.

Culex niveitarsis Coq.

This species was first met with May 9th, on the Garret Mts., near Paterson. Only a single fully matured larva was taken; it occurred in a rocky pool with larvæ and pupæ of *Culex canadensis* and *sylvestris*, from which it was at once separated by its conspicuous rusty brown color and robust form. May 12, a new species—*niveitarsis* ♂—hatched from one of the pupæ; and it was recognized as theretofore undescribed, and the larva was put in alcohol. May 14, another collection was made, resulting in five specimens of the new species being found, together with larvæ and pupæ of *canadensis*, *sylvestris* and *Aedes fuscus*. Two of the larvæ were preserved in alcohol and the other three fell prey to some small Dytiscids which had been overlooked in bottom material. From the pupæ one ♀ *C. niveitarsis* emerged May 17. Later collecting in the same pool where they occurred failed to turn out any additional material of this species, and from this it appears that it also is a single brooded, early spring form.

The larva is a very stout, robust wriggler and measures 7–7.5 mm., in length to the end of the ninth segment. In color, it is grayish white, profusely mottled and shaded with brown. The head is about one and one half times as broad as long, and of a yellowish brown color. The posterior part of the vertex is maculated with a dark brown crescent shaped spot and a smaller one each side of it. Six hair tufts of 6 or 8 hairs each arise from the anterior part of the vertex, four in the central part and one at the base of each antenna. The antenna is of moderate length, pale yellowish, becoming brown at the apical third, the surface covered with rather large spines and many smaller ones intermingled; the apex with one long and three shorter spines besides a little joint. The tuft is situated on the shaft considerably below the middle and consists of 8 or 10 hairs. The rotary mouth brushes are deep orange in color, with the hairs of the central part pectinated at their tips. The mentum is triangular in form, twice as broad as high, with nine blunt teeth on each side of the apex. The maxillary palpus is normal, with a large apical tuft, a stout basal joint, and hairs over the surface arranged in rows and patches. The mandible is normal in form, peculiar by its very blunt teeth.

The thorax is rounded with slight lateral angles giving rise to moderate hair tufts; two very small tufts are also on the anterior margin. The dorsal surface is a little depressed and symmetrically blotched with brown. These markings differ as to shape, but always resemble two transverse bands, the anterior one broken in the middle.

The abdominal segments are thick and robust, each with lateral tufts of two hairs each, except the anterior two, which usually have 4 or 5 hairs. The eighth segment has a large patch of small scales on each side, about 45 in each patch, arranged in three or four irregular rows. The individual scale is rather long, broadest in the middle, with a small apical spine, and lateral ones becoming very small basally. The anal siphon is yellowish brown, about three and one half times as long as broad, with the lateral rows of spines extending half the length of the siphon from the base; the single spines broad at the base with one large tooth, or with one or two smaller ones beside the large tooth. The ninth segment is almost square, largely covered by the chitinized saddle; the double dorsal tuft and ventral brush moderate, the latter with two small tufts below the barred area. The anal gills are one and one half times as long as the ninth segment.

Culex siphonalis Grossbeck.

Four specimens of the larvæ were taken in a swampy woodland area, near New Brunswick, N. J., April 25, with *Culex canadensis* and *Corethra cinctipes* They were recognized as new to us by the unusually long and tapering anal siphon, and were put in a separate jar to breed; they did not do well in confinement and May 7, two died, so the other two were put in alcohol. April 27, twenty specimens, all rather well grown were brought in, and on May 2, as many more. They were comparatively rare, and difficult to secure, seldom rising to the surface and inhabiting only the deep pools.

The larva measures 9-11 mm., in length excluding the anal siphon and is not robust in appearance. The body is light gray or yellowish brown in color, with the thorax somewhat darker. The head is about one and one half times as broad as long, yellowish to light brown, though the vertex is often clouded so as to give the appearance of a dark brown head. The posterior part of the vertex is marked by four spots and a semi-circular blotch, which are often obscured by the clouds. Four tufts of two hairs each are situated on the top of the head in the anterior part and a larger tuft is at the base of each antenna. The antenna is moderately long, somewhat sharply curved, the surface sparingly set with spines, rather thickly at the base, and with three or four regular rows of minute spines from the base toward the apex on the inner side. The tuft is well below the middle and consists of but two or three hairs. In color the antenna is brown, very dark toward the tip, the apex with three spines of different lengths, a very short spine and a small joint. The eyes are large and black and the rotary mouth brushes are pectinated in the central hairs. The mentum has slightly curved edges of 11 or 12 teeth on each side of the apical one and becomes very broad at the base. The mandible is normal, with a group of small spines at the base. The maxillary palpus is set with spines and patches of hairs over the surface and has a chunky little joint at its base.

The thorax is as long as broad, only slightly angulated at the sides, the lateral tufts moderately long and, in addition, there are two very small tufts on the anterior margin.

The abdominal segments from 1 to 7 are oblong or sub-quadrate in form, with three or more hairs to the lateral tuft in the first and second segments, two hairs to the tuft in the following segments. The eighth segment has from 24 to 30 scales to each of the lateral patches; the single scales long, with three spines at the apex, the central one very long and very fine ones along the sides.

The anal siphon is pale yellow in color, slightly darker near the tip, very long, being about five times as long as its width at the base and evenly tapered toward the apex. The spines, from 15 to 22 in each row, extend almost to the middle: they vary in size and in the number and length of the teeth; the short ones always toward the base; the apical two separated from the rest and from each other. The siphonal tufts at the end of the rows have but three or four long hairs. The ninth segment is slightly longer than broad with the usual dorsal and ventral tufts, the latter with several small tufts below the barred area. The anal gills are stout and moderate in length without visible tracheæ. The larva differs obviously from that of *cantans* in the antennal structure, in the form and arrangement of the scales on the eighth segment and in the form and armature of the anal siphon.

Culex pretans Grossbeck.

The connection between the larva here described and the adult is not positively made, but there seems little doubt as to the correctness of the association. A mixture of full grown larvæ and pupæ was collected from woodland pools in the Great Piece Meadows, May 10, 1904. The larvæ were put in alcohol and the pupæ left to develop. On May 12, 1 ♂ and 1 ♀ *Culex pretans*, together with specimens of *canadensis* and *sylvestris* emerged from the pupæ. The alcoholic larvæ were examined at once and were found to be *canadensis*, *sylvestris*, *Aedes fuscus* and four larvæ which were new to us, and as we had the larvæ of all other New Jersey species thus far known, excepting *perturbans*, we thought it quite safe to associate them with *pretans*.

The larvæ are from 5.5-6mm. in length to the end of the ninth segment and are pale to dark gray in color. The head is one and one half times as broad as long, yellowish, with a large brown blotch in the anterior part of the vertex, similar to *C. sylvestris*. There are four hair tufts of 4 or 5 hairs each in the center of the vertex and a larger one at the base of each antenna. The antenna is rather short, slightly curved, pale yellow in color, faintly infuscated apically, thickest a short distance from the base and has the surface sparsely set with stout spines and numerous small ones arranged in longitudinal rows. The tuft is situated well below the middle and consists of 8 or 10 hairs which do not reach the apex; the apex with one long spine, several smaller ones and a small joint. The rotary mouth brushes are dense, with the hairs of the central part pectinated. The mentum is triangular in form, with 15 to 17 small teeth on each side of the apex. The mandible and maxillary palpus are normal, the latter with a moderate apical tuft and stout basal joint.

The thorax is very much broader than long, with angulated sides, each angle set with acute infuscated tubercles from which issue moderate sized hair tufts and there are two very small tufts near the anterior margin.

The abdominal segments are subequal, each bearing lateral hair tufts of from 2 to 5 hairs each, the larger number on the anterior segments. The lateral patches of scales on the eighth segment are large, having from 25 to 30 scales in each patch. The individual scale is elongated, with a rather small apical spine and smaller ones fringing the sides. The anal siphon is two and one half times, or slightly over, as long as broad, yellowish brown in color, thickest near the base and tapering a little apically. There are from 16 to 20 spines in each of the rows, the single spine with one or two teeth near the base. The ninth segment is almost square, nearly ringed by the chitinized saddle, and with the double dorsal tuft and ventral brush normal and moderate in size, the latter with several small tufts below the barred area. The tracheal gills are slender, about two and one half times the length of the ninth segment and taper to a point.

Culex inconspicuus Grossbeck.

Larvæ of this species were taken with *C. sylvestris* on the Garret Mts., near Paterson, N. J., Sept. 29, 1903. They began to die off in the breeding jar before it was known that we had a new larva to deal with. Then, only *sylvestris* were left alive but remnants in the bottom of the jar were placed in alcohol. In these remnants only the more strongly chitinized parts of the larvæ remained, the anal siphon and the head case. The antennal attachments seem to offer but little resistance to decomposition: only one had retained them and these were in such condition as not to allow a description to be drawn.

From the pupæ in the jar, adult *C. inconspicuus*, emerged as follows: 1 ♂, Oct. 4; 1 ♂ and 1 ♀, Oct. 5; and 1 ♂, Oct. 6.

The larva presents a general resemblance to *C. sylvestris*, but is much smaller. The mandibles and maxillary palpi are also similar to that species, but the sides of the mentum are more rounded and have fewer teeth,—10 or 12 on each side of the apex. The hairs of the rotary mouth brushes are pectinated. The antennæ as well as could be seen were very much like those of *C. sylvestris*. The anal siphon is about three times as long as broad with 16 to 22 spines in each of the lateral rows; the individual spines are rather slender, and with one or two teeth near the middle, but in one larva the spines were stouter and had as many as four teeth on one spine. The lateral patches are large, each with about 40 to 45 scales, the single scale with long slender apical spines and shorter lateral ones. The ninth segment is as broad as long, not quite ringed by the saddle and with the dorsal tuft and ventral brush moderate in size, the latter with small tufts below the barred area. None of the specimens retained the tracheal gills.

SOME BAHAMA ORTHOPTERA

BY ALBERT P. MORSE, WELLESLEY, MASS.

In the summer of 1904 Dr. Glover M. Allen of the Boston Society of Natural History, and Messrs. Thomas Barbour and Owen Bryant of Harvard University spent several weeks in a zoölogical collecting trip to the northern Bahamas. The orthoptera secured, including some apparently undescribed species, form the subject of the present paper, in which are incorporated several notes by Dr. Allen on the habits of some of the species observed by him. This is the sixth of a series of short papers based on the material collected.

BLATTIDAE.

1. *Ischnoptera blattoides* Sauss. Mangrove Cay, Andros, O. Bryant.
2. *Eurycotis* sp. indet. Mangrove Cay, Andros, O. Bryant.
3. *Periplaneta americana* Linn. New Providence; Mangrove Cay, Andros, O. Bryant.
4. *Periplaneta australasiae* Fabr. New Providence; Mangrove Cay, Andros, O. Bryant.
5. *Rhyparobia maderae* Fabr. Exact locality not given.
6. *Pycnoscelus surinamensis* Linn. New Providence.
7. *Hemiblabera* sp. indet. Mangrove Cay, Andros, O. Bryant.

ACRIDIIDAE.

8. *Orphulella olivacea* Morse. 1 ♂, Stranger Cay, July 14, G. M. Allen. "Fairly common back from the shore along the upper beach."
9. *Amblytropidia?* 1 juv., Nassau, June 28, G. M. Allen.
10. Tryxaline, indet. 1 juv., Nassau, June 28, G. M. Allen.
11. *Schistocerca americana* Drury. 2 ♂ 1 ♀, juv. 3, 5, Nassau, June 28, G. M. Allen; 1 ♂, Elbow Cay, July 3; 1 ♀, Mangrove Cay, Andros, Aug. 1 to 7, O. Bryant; 1 ♂, Stranger Cay, July 14, G. M. Allen.

    "Common at Nassau in the gardens near the hotel. They were also very common at Stranger Cay, where on July 14 and 15 we saw numbers along the edge of the bushes on the upper part of the beach."
12. *Schistocerca* sp. 2, juv. 2, 4, Nassau, June 28, G. M. Allen; pale fulvous in color.
13. *Schistocerca* sp. 1, juv. 3, Nassau, June 28, G. M. Allen; 2, juv. 4, 5, Mangrove Cay, Andros, Aug. 4, O. Bryant; 1 juv. 2, Stranger Cay, July 14, G. M. Allen; color green or yellowish green.

✓ 14. **Paroxya dissimilis** sp. nov.

Resembling *P. atlantica* in size and appearance but differing markedly in form of male genitalia. The cerci are nearly three times as long as their basal width, slender, narrowing rapidly in their basal half to less than one-third their basal width, approximately equal in middle third, slightly dilated apically (chiefly on dorsal margin) the ventral margin straight except at base, the dorsal margin sinuous, the apex truncate, slightly more than half as wide as base, its dorsal angle rounded; the whole organ is moderately and regularly incurved, its apex flattened externally, convex internally, with revolute margins. Furcula similar to that of *atlantica* but shorter and the tips less pronounced.

Antenna: (estimated) ♂, 10, ♀, 8; body: ♂, 18.2, ♀, 20.5; hind fem.: ♂, 11.5, ♀, 13.7; tegmina: ♂, 14, ♀, 16 mm.

One ♂, one ♀, Mangrove Cay, Andros, Aug. 4, O. Bryant.

✓ 14 a. *Paroxya* sp. juv. 2, 4, 5. Stranger Cay, July 14, G. M. Allen.

Very likely identical with the preceding.

LOCUSTIDAE.

✓ 15. *Conocephalus nietoi* Sauss. 1 ♀, juv. 4. Nassau, June 28, G. M. Allen.

✓ 16. *Conocephalus* sp. 4 specimens, juv. 1, 2, Nassau, June 28, G. M. Allen; vertex acuminate.

✓ 17. *Xiphidium fasciatum* DeG. 1 ♂, 1 ♀, Nassau, June 28, G. M. Allen. In the ♂ the wings barely pass the hind knees, in the ♀ they extend 6mm. beyond them. Mr. Allen states that the green grasshoppers taken at Nassau "were collected among the grass on the estate of Mr. Robert Johnstone. Most of the grass in the Bahamas is confined to such places as have been cleared and cultivated."

✓ 18. **Xiphidium insulare** sp. nov.

This is a slender species related to *X. gracillimum* but with the vertex wider (at least one-third the distance between the eyes), and less produced (five-sixths the length of eye viewed from above), the hind femora proportionally shorter, and the lateral lobes of the pronotum distinctly polygonal in outline instead of triangular.

Body: 11; tegmina: 15; wings: 18; hind femora: 10; total length (vertex to end of wings): 22 mm.

1 ♂, Stranger Cay, July 14, G. M. Allen.

Three additional specimens of this genus in early stages were secured, ✓ two at Nassau,, and one on Mangrove Cay.

GRYLLIDAE.

19. **Mogisoplistus barbouri** sp. nov.

A larger and stouter species than *slossoni* of Florida, with the auditory foramina elliptic, twice as long as wide (in *slossoni* circular). Pronotum quadrate, narrowed anteriorly, strongly convex transversely, the front and hind margins truncate, the sides barely convex. Hind femora stout, about two-fifths as wide as long. Body and legs clothed with white scales. Hind legs with lower margin of femora, edge of tibiae, and sides of metatarsus with delicate white or brownish pile, the under side of the metatarsus and its spurs covered with a dense brush of brown pile. Anterior and middle legs pilose, and with numerous additional long, slender, scattered hairs, attaining a length on the femur of half its diameter, on the tibia equalling its diameter. Ovipositor rather stout, barely lanceolate at tip.

Body: 10; hind fem.: 2.3x6; hind tib.: 4.5; ovipositor: 5; antenna: 13 +; pronotum: ant. margin, 1.8, post. margin, 2.7, length, 2.4 mm.

One ♀, Nassau, July, T. Barbour.

20. *Cycloptilus americanus* Sauss. 1 ♂, 1 ♀, Nassau, G. M. Allen.

21. *Nemobius* sp. 1 juv. ♂, Nassau, June 28, G. M. Allen.

22. **Nemobius alleni** sp. nov.

Body short, stout, somewhat depressed; antennæ extremely slender, two and a half to three times as long as the body. Beneath brown; above, fuscous, finely maculate with brown. Hind femora with three transverse fuscous fasciae on apical three-fifths, at base brown with numerous narrow, oblique fuscous stripes. Bristles of head, pronotum and legs black; pubescence of body, legs and cerci brown.

Spines of hind tibiae three in number on each side, forming a graduated series with the longest apical spur (which equals the metatarsus) and densely pubescent, the hairs on the ventral side extremely long. Auditory foramina of male linear, of female lanceolate, the apex distal. Tegmina of male covering two-thirds of abdomen, nearly as wide as long, black, indistinctly varied with brown; truncate, the speculum and apical area aborted. Female completely apterous. Ovipositor moderately stout, compressed, gently but distinctly arcuate, shorter than hind femora, the tip slightly lanceolate, minutely denticulate on its dorsal margin; cerci equalling ovipositor, slender, villose, the hairs at base one-third as long as cercus.

Body: ♂, 5 to 6; ♀, 6; hind fem.: ♂, 4.5; ♀, 5; ovipositor: 4; antenna: ♂, ♀, (estimated) 15 mm.

Two ♂, 2 ♀, Moraine Cay, July 13, G. M. Allen. 4 ♂ and 3 ♀ nymphs in the fourth and fifth stages were also secured.

This interesting little cricket, which was collected by Dr. Allen, for whom I take pleasure in naming it, was "found abundantly along the edge of a mangrove swamp that extended for some distance out from the shore. On approaching this swamp from the landward side my attention was attracted by a faint but continuous cricket-like note which seemed to come from all about me. After a careful search among the black roots of the mangroves and the water-soaked leaves at their bases, I found numbers of the little insects. They were extremely quick and agile, and although it was easy enough to see them as they leaped aside at my approach, they immediately became invisible on alighting, so closely did they harmonize in color with the dark sticks and leaves. In this thick undergrowth the use of a net was practically out of the question, even if I could have been quick enough to sweep up the active little creatures. I found, however, that I could easily drive two or three at a time on to a sheet of newspaper that I spread on the sodden surface of the swamp, and with a slow but steady motion a wide-mouthed bottle could be brought above a resting insect and clapped over him before he could escape."

23. **Gryllus bryanti** sp. nov. With the general facies of *G. firmus*.

Head black with faint brownish markings. Pronotum one and a half times as wide as long, black, with narrow, irregular, poorly defined, yellowish-brown markings along the posterior half of the lateral carinæ, anterior half of median line, and anterior and posterior margins. Tegmina black, the veins and venules of the lateral field luteous, entirely covering body, reaching hind knees. Wings fully developed, extending nearly to the end of the hind tibiæ. Legs brownish fuscous, the hind tibiæ with 6 or 7 spines on each side, not widely divaricated; the upper and middle calcaria of equal length, less than one-half the metatarsus (in *firmus* one-half to three-fifths), the longest metatarsal spur reaching less than half way down the last tarsal joint (in *firmus* extending one-half or two-thirds its length.) Ovipositor slender, shorter than body, about one and one quarter times as long as the hind femora.

Body: 22; pronotum: length, 4, width, 6; tegmina: 16; wings: 26; hind fem.: 14; ovipositor: 18 mm.

One ♀, Mangrove Cay, Andros, Aug. 4, O. Bryant.

✓ 24. *Cyrtoxipha* sp. indet. One ♀, badly damaged, Nassau, G. M. Allen.

✓ 25. *Amphiacustes annulipes* Serv. 1 juv. ♂, Nassau, June 28, G. M. Allen.

26. **Amphiacustes bahamensis** sp. nov.

Related to *annulipes* and *fuscicornis*. Antennæ of great length and extreme tenuity, seven to eight times as long as the body in the male. Vertex strongly depressed at the level of the middle of the eyes. Pronotum once and a half (♀) or twice (♂) as wide as long, its lateral lobes with the ventral margins strongly oblique, the angles broadly rounded. Female apterous. Tegmina of male covering two-thirds to five-sixths of the abdomen, reddish brown, the veins pale yellow; speculum symmetrical, equaling one-third of a circle, arcuate behind, obtuse-angulate (120°) in front, crossed by two dividing venules, the posterior arising midway of the posterior border and curving forward to join it again near the external angle, the anterior arising a little nearer the internal angle than the origin of the first and crossing the speculum by a course at first straight and then for a short distance arcuate to strike the external border at or just behind the external angle. Post-anal vein angulate in the middle, and sending a venule from the angle to the anterior angle of the speculum with whose antero-external border it is continuous save for an almost imperceptible truncation due to the junction of the diagonal vein. Oblique veins 3 or 4, the first two sinuous.

Supra-anal plate of male truncate, its lateral margins sinuate, somewhat revolute, sometimes prolonged at the posterior angles into projecting, vertically placed, flattened processes.

Body dark reddish brown above, pale brown or luteous beneath. Anterior and posterior margins of pronotum and a line behind posterior margin of eyes pale yellow; a transverse poorly defined band on the vertex and another on the anterior third of the pronotum yellowish brown. Legs longer and a little slenderer than in *annulipes*, pale brown and luteous, the hind thighs rusty at base and fuscous along ventral sulcus; the fore and middle thighs not annulate with fuscous as in *annulipes* but all joints sometimes sparsely marked apically with dark brown.

Antennæ: ♂, 115-120; body: ♂, ♀, 16.5-17; pronotum: ♂, 3x5.5-6, ♀, 4x6; tegmina: ♂, 6x8.5: ant. fem.: ♂, 10-11, ♀, 10.5; middle fem.: ♂, 11-12, ♀, 11; post. fem.: ♂, 20-23, ♀, 21; post tibiæ: ♂, 21-25, ♀, 23; ovipositor: 16mm.

Three ♂, one ♀, Mangrove Cay, Andros, Aug. 4, O. Bryant. Three ♀ nymphs in the fifth stage and one in the first were also secured.

Dr. Allen writes concerning the crickets of this genus that they "were on several occasions found in numbers just within the entrance of some rather open caves in the limestone rock both at New Providence and on the Abacos. They were crawling about on the roofs of the caves and seemed to avoid the floor. Mr. Barbour caught two or three at Nassau about some large trees towards evening. The note of these crickets is a rasping 'scre-e-e-e-p' with an upward inflection."

LIFE HISTORIES OF NORTH AMERICAN GEOMETRIDAE.—LVIII.

BY HARRISON G. DYAR, WASHINGTON, D. C.

Mesoleuca vasiliata Guenée.

Egg. Elliptical, rounded, normal, the depression marked; all rounded, no flat areas; evenly reticulate with broad low lines, hexagonal, finely punctate shagreened all over. Pale waxy yellow; size .9 x .6 x .5 mm.

Stage I. Head rounded, whitish testaceous, eye black, mouth brown. Body thin and slender but not rapid in motion, becoming rigid erect when disturbed; white, the ends (joints 2–4, 10–13) yellowish tinged in certain lights from their retraction. No marks; no shields; tubercles concolorous, obscure; setae stiff, pale, rather conspicious.

Stage II. Head rounded bilobed, the apex of clypeus depressed, shining light yellow, ocelli black; width .5 mm. Body slender, rather elongate, normal, coarsely annulate. Setae rather coarse, white; no shields; tubercles invisible; no marks, food green.

Stage III. Head round, bilobed, free, lobes full, shining ochraceous luteous, clypeus depressed, ocelli black; width .8 mm. Body moderate, green from the food, unmarked, the folded incisures whitish; tubercles a little elevated, round, shining, colorless; feet pale; no shields; setae short, pale; subventral fold prominent.

Stage IV. Head rounded, shining, caramel luteous, setae brown, ocelli black; width 1.1 mm. Body cylindrical, slender, the central segments well elongated. Translucent green, incisures narrowly folded, yellowish; tubercles small, round, white, elevated, distinct. The dorsal vessel shows darker and the tracheal line white by transparency. No marks; no shields; thoracic feet brown. About joint 9 a broad stigmatal band begins and runs to the anal feet. It is also slightly indicated on thorax. Setae moderate.

Stage V. Head long, bilobed, green, shagreened, the lobes full, pale greenish, the epistoma, and antennae whitish with a short white band before the eyes; width 1.7 mm. Body moderate, elongate, cylindrical, the segments wrinkly annulate, anal feet large, projected outwardly. Green, anal feet and dorsum of joint 13 shaded in vinous; tubercles elevated, rounded, white like small buttons. Very faint longitudial white washed lines; dorsal vessel dark green; setae moderately long, distinct. Later the head acquired a red flush over the lobes.

Food plant thimbleberry (*Rubus nutkanus*); the hatched larvae ate this plant and a wild larva was found on it. Larvae from Kaslo, British Columbia.

RECENT ENTOMOLOGICAL LITERATURE.

MOSQUITOES OR CULICIDAE OF NEW YORK STATE: BY E. P. FELT, STATE ENTOMOLOGIST.

(BULLETIN 79, N. Y. STATE MUSEUM, 1904). The great interest taken in the *Culicidae* by the leading entomologists of the country is most gratifying, and their method of procedure highly commendable, viz: first working out thoroughly the life history of the various species, so as to be able to combat them in the most practicable manner.

It is really surprising the number of new forms which have been discovered since the crusade on the mosquito began. Less than twenty-five years ago the number recorded from North America was 33, and it is only about four years since 24 was the number given for the United States.

This work of about 160 pages and 57 plates, is one of the most important publications on the *Culicidae* that have appeared since Theobald's monograph. An interesting introduction treating of mosquitoes as carriers of disease, their distribution, life history, natural enemies, etc., is followed by description of species supplemented by keys to the genera and species, covering adults and larvae. The work is profusely illustrated by 113 excellent figures in the text, and by 57 plates containing over 200 figures, reproduced from the author's photomicrographs of balsam mounts prepared by D. B. Young. These reproductions are exceedingly fine, especially those of the genitalia, wings, and portions of wings greatly enlarged to show the form of the scales.

The following new species are described: *Culex absobrinus*, *C. magnipennis*, *Corethra karnerensis*, *C. lintneri*, *Sayomyia rotundifolia*, *S. hudsoni* and *Culex abfitchii*, the latter based only on the larvae. The main portion of the work closes with a very complete bibliography of the *Culicidae*, commencing with the year 1847. There is given in an appendix (pages 391a to 391f), "A generic revision of the *Culicidae*," in which are proposed the following new genera: *Culicelsa*, type *taeniorhynchus* Wied.; *Culicada*, type *canadensis* Theo., *Ecculex*, type *sylvestris* Theo.; *Culiseta*, type *absobrinus* Felt; and *Protoculex*, type *serratus* Theo.

C. W. J.

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Ulmer, G. Uber westafrikansche Trichopteren*, 22 xxviii, 353. [New genus *Hyalopsyche*].

LEPIDOPTERA.

Brues, C. T. The occurrence of a tropical butterfly in the United States [*Eubargis dionis* Hbn.], 5 Jan. **Cuenot, L.** Y a-t-il une relation entre le sexe et la taille des oeufs chez les lépidoptères? 73 4e série, tome iii, No. 2. **Daecke, E.** Notes on *Prionapteryx nebulifera* Steph., 5 Jan. **Fernald, C. H.** A new species of North American *Proteoteras**, 4 Jan. **Kearfott, W. D.** (a) A new Gelechid from Ontario*, 4 Jan.; (b) New Tortricids*, 4 Jan. **Lyman, H. H.** Further notes on types, etc., in the British Museum, 4 Jan. **Nason, W. A.** Micro-lepidoptera of Algonquin, Illinois, 5 Jan. **Ragusa, E.** Note lepidopterologiche (con tavola), 166 xvii, No. 5. [Figures *Satyrus semele* ab. *triocellatus* Ragusa and *Epinephele lycaon* ab. ♂ *biocellatus* Ragusa]. **Williams, F. X.** The larva of *Hepialus sequoiolus* Behrens, 5 Jan. **Wolley Dodd, F. H.** List of Macro-lepidoptera of Alberta, cont., 4 Jan.

DIPTERA.

Czerny, P. L. Revision der Helomyziden*, 38 xxiii, 199. [The genus *Gymnomyza* Strobl being preoccupied, *Actenoptera* is proposed in its stead. Two other new genera, *Blaesochaetophora* and *Eurygnathomyia* are proposed. Three other species are described]. **Meunier, F.** Contribution à la faune des *Helomyzinae* de l'ambre de la Baltique, 65 Dec. **Portevin, G.** Contribution au Catalogue des Diptères de Normandie (suite), 65 Jan. **Smith, J. B.** How does *Anopheles* bite? 68 Jan. 13.

See also Smith, under Economic Entomology.

COLEOPTERA.

Fleischer, Dr. A. *Liodes (Trichosphaerula* m.) *scita* Er., 38 xxiii, 261. [A new subgenus]. **Ragusa, E.** Catologa ragionato dei coleotteri di Sicilia (cont.), 166 xvii No. 5. **Vitale, F.** Osservazioni su alcune specie di Rincofori Messinesi, Nota II (cont.), 166 xvii, No. 5.

HYMENOPTERA.

Ashmead, W. H. New Hymenoptera from the Philippine Islands*, 4 Jan. New genera *Apterencyrtus* and *Brownius*]. **Bradley, J. C.** *Ropronia*, an anomalous hymenopteron*, 5 Jan. [One new species, *ashmeadii*]. **Cockerell, T. D. A.** Some American Hymenoptera, 5 Jan. **Ducke, A.** Revisione dei Crisididi dello stato Brasiliano del Para, 69 xxxvi, 13. **Enderlein, Dr. G.** Die Braconiden—subfamilie *Mimagathidinae**, 22 xxviii, 449. [A new subfamily, and a new genus, *Mimagathis*]. **Fielde, A. M., and Parker, G. H.** The Reactions of Ants to Material Vibrations, 1 Sept. **Marchal, P.** Recherches sur la biologie et le développment des hymenoptères parasites: I. La polyembryonie spécifique ou germinogonie, 73 4e série, tome ii No. 3. **Sanderson, E. D.** The Kelep and the Cotton Plant, 68 Dec.

THE NOVEMBER EXHIBITION.

A public exhibition of insects was held by the Cambridge Entomological Club on November 16, 17, 18 and 19, in the rooms of the Appalachian Mountain Club on the tenth floor of the Tremont Building. The number of visitors, estimated at 350, gave evidence of a growing interest in entomology among the people of Boston and its vicinity. Collections were shown illustrating Variation, Protective Coloration, Hybridity and other phenomena of insect life.

Only a brief mention of each exhibit can be made here. Mr. W. D. Denton entered a fine display of lepidoptera mounted in tablets. Mr. C. V. Blackburn's remarkable collection of moths obtained about two electric lights in the city of Woburn, in a single season, attracted much attention. Miss Soule's hybrid lepidoptera and Mr. F. H. Foster's bred series of Haploas were extremely interesting. Mr. W. F. Low's exhibit was one of the most extensive shown, and embraced, in addition to a fine series of hybrid moths, some remarkable aberrant examples of *cecropia* and *promethea.* Mr. Johnson showed a fine collection of Hymenoptera with Dipterous mimics. Mr. Hayward's exhibit was a carefully-prepared synoptic collection of the families of Coleoptera, with explanatory labels. Mr. A. C. Sampson's display included the five-winged *cecropia* figured in the December Psyche, and a collection of moths showing conspicuous individual variation. Mr. Field entered a number of small groups of lepidoptera arranged to show the phenomena of individual variation, sexual dimorphism, etc. Mr. J. H. Rogers, Jr., had a fine exhibit which included a number of abnormal specimens of lepidoptera. Messrs. W. R. and J. D. Pearmain showed a large number of specimens in tablets. Mr. Newcomb's contribution included a series of very unusual Basilarchias, a series of *Oeneis katahdin* with specimens of *semidea* and *jutta* for comparison, and some interesting aberrant forms of different species. Mr. A. P. Hall showed some of his beautiful photographic prints of bleached wings.

Altogether the affair was a great success, though it is unfortunate that there should be such an overwhelming preponderance of lepidoptera in the exhibits. It is hoped that the present year may be marked by a larger and better exhibiton, which shall fairly represent the activity of New England entomologists.

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PSYCHE

THE ENTOMOLOGICAL WORK OF DR. A. S. PACKARD.

BY JOHN B. SMITH. SC. D.

Very few persons realize the extent or appreciate the character and value of the entomological work done by Dr. A. S. Packard. Not the systematist purely, for he will find much of the work superseded, not accepted, or so generally accepted that the original author is no longer recognized; not the entomotomist purely, for he will recognize only the specific result obtained and not the bearing of that result which Dr. Packard had usually in mind in his anatomical investigations; and surely not the modern economic entomologist, for he has now advanced far beyond any point ever reached by our author.

It is only within the past year or two, when it became necessary for me to study rather closely an almost complete series of his writings, that I began to appreciate the volume and general high standard of Dr. Packard's works. They illustrate a marvelous comprehension of the subject as a whole, a grasp of detail in many groups that is astonishing, and a knowledge of the literature that is surprising when its scattered condition and the variety of languages in which it appeared, is considered.

Dr. Packard was both an investigator and a teacher: as a teacher in the class room or in the laboratory I know nothing of him; as a teacher through books he has taught more students than any other American Entomologist. He was not a writer of numerous short papers, of hasty criticisms or of single descriptions; and yet his publications were many, some of them brief and many critical; but all had a purpose—the conveyance of knowledge or the correction of error—the correction always made without reflecting upon the honesty or capacity of him who made it necessary. Not that Dr. Packard made no errors himself: no one was more ready than he to recognize his liability in that direction, and he was not ashamed to admit it. Not infrequently he changed his conclusions, and when we compare the first edition of the Guide, with the "Text Book," the full extent of the revision of such conclusions becomes apparent.

As a systematist Dr. Packard was interested primarily in the general arrangement of the Class, and he was among the first if not the first American that accepted the necessity of breaking up some of the Linnaean orders and proposed a

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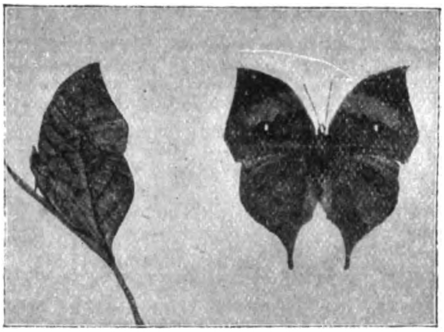

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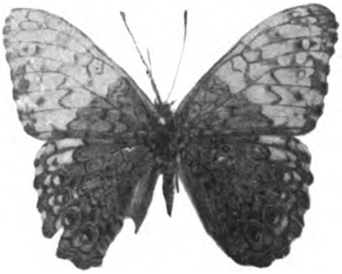


Fig. 1. Type of *Amphichlora poseidon* n. sp., from El Valle, Margarita Island, Venezuela.

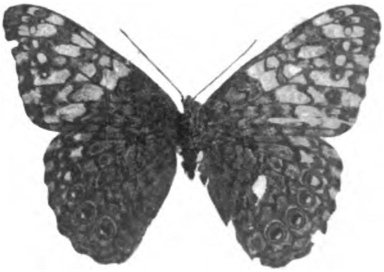
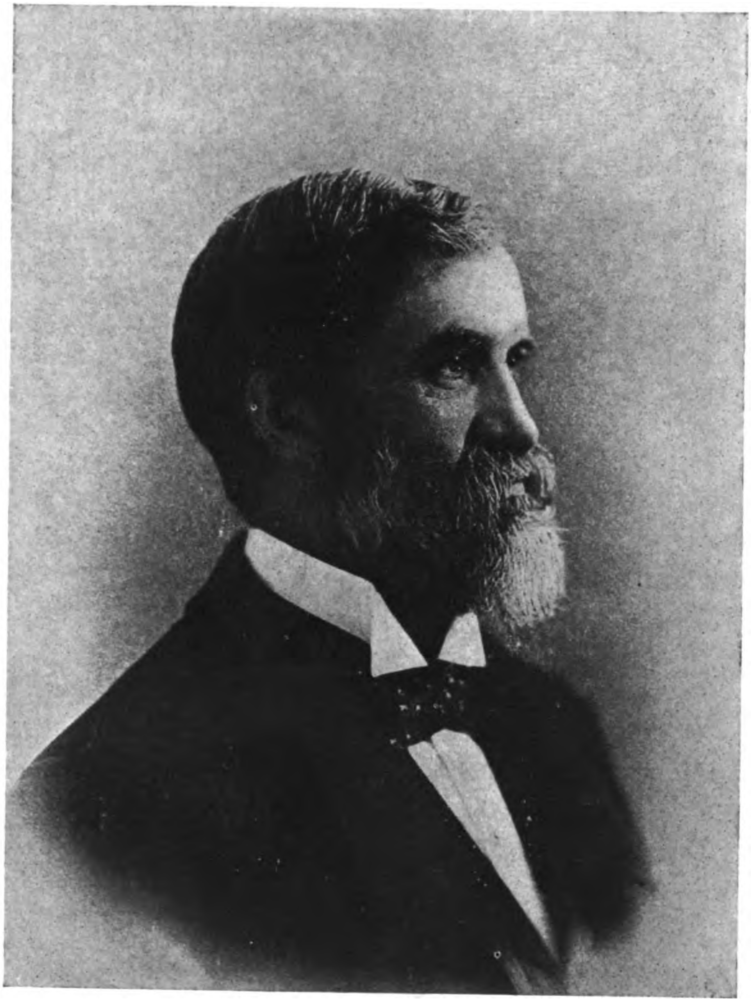


Fig. 2. *Amphiclora ferentina* Godt., from same locality, taken at same time.



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